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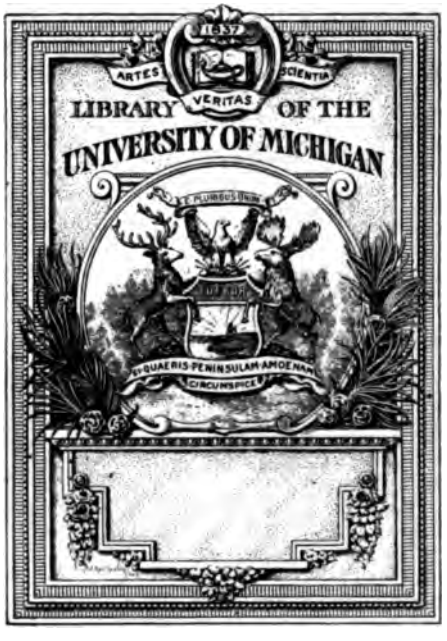
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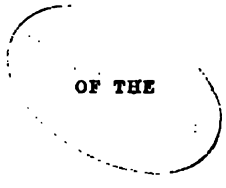

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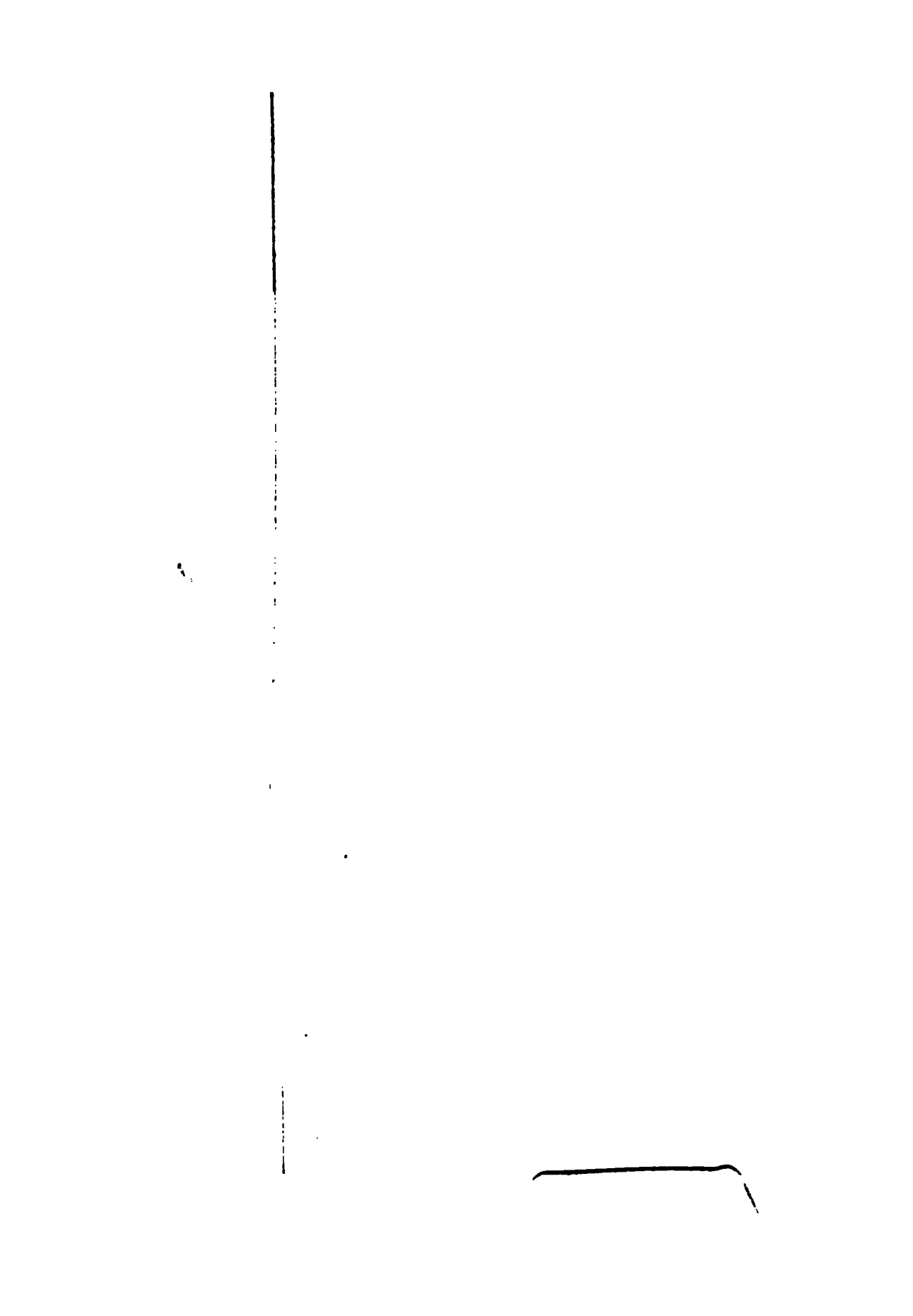

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PROCEEDINGS

OF THE

ACADEMY OF NATURAL SCIENCES

OF PHILADELPHIA.

1859.

January 4th.

President LEA in the Chair.

Forty-eight members present.

Mr. W. Parker Foulke presented some cones found in April, 1858, by Mr. Samuel I. Goucher, on a peak of the Blue Mountain, near Mount Holly Springs, Cumberland County, Pennsylvania.

Mr. Durand stated that he had examined these cones, with a few leaves accompanying them, and had no doubt they were from the *Pinus pungens*, or table mountain pine, which he believed had not been previously recognized so far north.

January 11th.

Dr. CARSON in the Chair.

Thirty-seven members present.

Mr. Cassin read a letter from Mr. P. B. Duchaillu, dated Fernando Vaz River, Western Africa, September 28th, 1858, containing the following passages:

"Since I left the Gaboon in 1857, I have explored the Camma or Fernando Vaz river and the Ogobai river, which is a branch of the Camma, but was prevented from ascending the latter by the natives. I have ascended also to the distance of about two hundred miles the Rembo and the Ovenga rivers.

"The country of the Nazareth and the Camma is intercepted by large rivers, creeks and lagoons going in every direction into the interior, and to all of which the natives have given distinct names. Some of these rivers are wide and deep, and would be navigable for steamers to a great distance. In some places the soil is very rich and in others sandy; the ebony and red wood trees are very abundant.

"One of the most interesting facts that I have determined is, that the Cannibal tribe (the Paueins) which I met with on the head waters of the river Muni, seem to terminate in the interior, up the Nazareth river, the banks of which are inhabited by various tribes calling themselves Orounga, Ogobai, Pandjai, Aninga, Okanda and Apindgi; none of these are cannibals, and they speak of the Paueins as farther north and in the interior, and my conclusion is, that this cannibal people either follow the mountains, which I think take here an eastern direction, or that they cease. Up the Rembo, which is the main branch

of the Fernando Vaz, the Bakalai tribes disappear; then follow a people calling themselves Ashira, and next to them come the Apindgi.

"Up the Ovenga, I left it and went into the interior amidst the Bakalai people and afterwards into the Ashira country. The Ashiras are quite a different people from any that I have yet seen in Western Africa. They cultivate tobacco extensively, and cotton to some extent also, but the principal cloth made by them is from a kind of grass which is very fine. Food with this people is abundant, and they are the only people I have yet seen in this country that had domesticated hogs.

"Immense forests, in which the ebony tree is very abundant, border the banks of the Fernando Vaz, but at the highest point that I reached, the country was more open, and grassy plains frequently presented themselves. I was assured by the natives that this was the character of the country still higher up the river and its branches, and they speak of a large prairie and of a large lake also further in the interior. The latter, as far as I can judge from the accounts of the natives, is about 600 miles from the coast. At present my intention is to make another journey about in the latitude of the Fernando Vaz in search of this lake, which I have some hopes may prove to be the source of the Congo. In this journey I may perhaps also ascertain the course of the mountains that I reached in ascending the Muni river.

I have made maps of all the rivers that I have ascended, and have, with much difficulty, kept my journal without intermission, and hope to lay it before the Academy on my return to the United States. I send by this vessel four boxes and three barrels containing collections of quadrupeds and birds, in which are many interesting specimens, and some that I have never collected before. All are from the Fernando Vaz or Camma, the Ogobai, Rembo and Ovenga rivers."

Dr. Leidy exhibited a drawing of the worm described by him at a former meeting as Manayunkia speciosa.

Dr. Leidy remarked, that perhaps some of the members present would recollect he had some time since, (Proc. 1858, p. 90,) described a curious fresh water worm, *Manayunkia speciosa*, from the river Schuylkill. It was observed that it appeared to be most nearly allied to the marine genus *Fabricia*. During the last summer, Dr. L. in company with Mr. Powel sought for the latter at Newport, R. I. They found it in very great abundance at the foot of the cliffs bathed by the ocean. In its curved tubes of tenacious mud, adhering to stones, and with its projecting tentacles, it very much resembles a ciliated polype, especially *Plumatella*.

The worm is about 1½ lines long, demi-cylindroid, with 12 annuli, of which all except the first are setigerous. The cephalic annulus has a short proboscis; is provided with one or two pairs of eyes, and supports six arms with about 80 ciliated tentacles. The succeeding 7 or 8 annuli are provided on each side with fascicles of from 5 to 7 setæ and as many podal spines. The posterior three annuli are provided on each side with fascicles of 2 setæ and from 12 to 15 short podal spines. Anterior setæ terminating in a linear lanceolate blade; posterior setæ aristate. Anterior spines terminating in a hook which is dentate on its convex border; posterior spines expanded at the extremity, which is dentated on the convex border. Caudal annulus with a pair of eyes.

Eyes exist in the cephalic and caudal annuli, also in the young worm. From the want of a good description and figures of the European species of *Fabricia*, it was not to be determined whether the American species was different from it.

January 18*th*.

President LEA in the Chair.

Forty-one members present.

The following papers were presented for publication in the Proceedings.

[Jan.

Catalogue of Birds collected on the rivers Camma and Ogobai, Western Africa, by Mr. P. B. Duchaillu, in 1858, with notes and descriptions of new species, by John Cassin.

Descriptions of two new species of tortoises, by John Le Conte.

Geological Explorations in Kansas Territory, by F. B. Meek and F. V. Hayden, M. D.,

And were referred to Committees.

Dr. Morris described a new species of Pomotis very common in the vicinity of Philadelphia, and characterised by a short auricular appendage and rounded caudal fin. The numbers of the rays are as follows:

D. 9–10. A. 3–9. P. 9. C. 16. V. 1·5.

The dorsal, anal and caudal fins are covered with spots of a lighter color than the fins themselves. The body of the fish is traversed by seven or eight blackish bands, the first passing through the eye, the second near the margin of the opercle, the third behind the pectoral, the fourth and fifth opposite the dorsal, the sixth, seventh and eighth from opposite the end of the dorsal to the root of the caudal. An opaline bluish spot is found on the opercular appendage, the general color of which is black. This species approaches the P. catesbei of Cuv. and Val. but is believed to be distinct. Dr. M. proposed for it the name of *Pomotis guttatus.*

Dr. Leidy called the attention of the members to some remains of cartilaginous fishes, discovered by Dr. F. V. Hayden and F. B. Meek, during the last summer, in the carboniferous formations of Kansas. One of these is a mutilated dorsal spine included in a fragment of rock, from the upper carboniferous formation of Leavenworth City. The spine may perhaps belong to one of the same fishes, to which the other specimens appertain, but there was no means at present to determine this fact. It was characterised as follows:

XYSTRACANTHUS ARCUATUS Leidy. Spine much curved; its posterior border forming the segment of a circle whose diameter would be about 2 inches. Length along the convex border, when perfect, about 2½ inches. Lower extremity 3½ lines wide. Section ovoid with the broader part posterior. Sides of the spine finely ridged longitudinally, and furnished anteriorly with small, oblique, hemi-elliptical tubercles; posteriorly provided, on the two sides together, with six rows of odontoid tubercles, of which those of the first row on each side are minute, and of the last row are the largest. Osseous structure of the specimen brown; odontoid tubercles invested with smooth, shining gray, enameloid substance, demi-conoidal, those of the posterior pair of rows sometimes coalescing across the back border of the spine and assuming a crescentoid form.

The second specimen was the fragment of a tooth, of a species of *Cladodus*, obtained from the Manhattan upper coal measures. It was characterised as follows:

CLADODUS OCCIDENTALIS Leidy. Enameled crown, when perfect, about an inch in length, demi-conical; the outer convex side provided with narrow oblique folds. Lateral denticles two, the outer one the larger. Base of the tooth reniform, with a breadth of about an inch, and the short diameter about 5 lines; lateral extremities provided with a pair of large ovoid tubercles, one above the inner margin, the other below the outer margin.

The third specimen is a tooth, apparently of PETALODUS ALLEGHANIENSIS,* from the upper carboniferous rocks, near Fort Riley. It differs from the tooth, upon which the species was originally founded, in no important point, except that it is larger. The breadth of the crown is about twenty lines; its height on the convex side 10 lines, on the concave side 1 inch.

* Journ. Acad. Nat. Sci. iii, 161.

January 25th.

Vice-President BRIDGES in the Chair.

Forty-six members present.

The Report of Proceedings of the Biological Department for the present month was read.

On report of the respective committees, the following papers were ordered to be printed in the Proceedings.

Description of two New Species of Tortoises.

BY JOHN LE CONTE.

KINOSTERNUM HENRICI.—Testa regulari-ovali, convexa, dorso subcarinato, postice valde declivi, margine non dispanso, laterali perpendiculari, sterno testam non omnino occludente, cauda longa, unguiculata.

Habitat New Mexico.

Head and neck dusky, on the top slightly varied with paler, beneath and on the sides, including the jaws, thickly speckled with yellow. Upper jaw entire, hooked. Chin with two small warts. Legs and tail dusky, fore feet with two folds on the upper side; hind legs squamous on the hinder side and likewise with two folds; tail black and rather long, furnished with a long, broad and rather pointed nail. Shell brownish yellow, regularly elliptic, convex, very declivous behind, with the remains of an evident keel on the three last scutæ, anterior and posterior margins not expanded, the lateral perpendicular with a considerable furrow for the greatest part of its length. Vertebral scutæ imbricate, the first one triangular with the apex truncate, applied to the nuchal and first marginal scuta, second, third and fourth urceolate, six-sided, the lower side of the fourth very short, the fifth triangular with all the angles truncate, so as to form a six-sided figure, of which the apical side is very short, the two upper lateral sides long and incurved, the two lower lateral short and perpendicular to the base which is doubly incurved so as to form a waving line; this scuta is applied to the two caudal marginals, the first lateral is irregularly four-sided, the second and third five-sided, the fourth four-sided, the anterior side straight, the superior oblique, the posterior curved first outward and then inward, so as to fit into the sides of the fifth vertebral and the last marginal; the nuchal scuta is small and square; the rest of the marginals except the last one, the caudals being excluded, are oblong, more or less angled on the top; the last one is larger than the rest, three-sided, pointed above and entering a cavity between the last vertebral and the last lateral; the base is straight and the two sides curved; the caudals are four-sided, the upper side curved. Sternum large and yellow, emarginate behind, jointed before by a ligament, behind by a suture anteriorly closing up the box of the shell, posteriorly very partially so; gular scuta very large, triangular, pectorals irregularly four-sided, the outer side a little wider than the inner, the lower side curved, the interior anterior angle very obtuse, the interior posterior rather acute, the two exterior right; brachials triangular with the apex truncate, and the upper side incurved; abdominals quadrangular, the membrane joining them with the femorals so wide as to make the joint appear double, femorals quadrangular, the inner side short, caudals right angled triangular.

Length of the shell 4·7 inches, height 1·9, of head and neck 2·8, of the tail 2.

This new tortoise was brought from New Mexico by Dr. T. C. Henry of the United States Army, and by him through Mr. Cassin presented to the Academy. It is an old individual. It appears that when young the scutæ of the back are marked with concentric striæ, and no doubt the whole of the upper surface varied in some degree with darker. When the *K. odoratum* is found in clear water streams it is beautifully varied, thus, for instance, those found in the Ogeechee river, in Georgia, which has a sandy bottom and is seldom or never

polluted with mud, they are marked on each scuta with diverging or radiating lines of darker.

I have not adopted Mr. Agassiz's name in describing this animal, as I do not think that his arrangement of *Kinosternoids* founded on a proper basis. If I were to adopt his classification, I should describe three of his genera as follows, premising that I think it is offering a violence to nature to separate the two first.

KINOSTERNUM.

Sternum entirely closing up the box of the shell, with eleven scutæ and eight bones, there being no entosternal, but the whole piece may be divided longitudinally from front to rear into two pieces, which are afterwards subdivided. The sternum is bilobed, each lobe moveable from the side of the abdominals on the posterior joint of the hyosternals and the anterior of the hyosternal bones. By closing the two lobes it is enabled to cover entirely the head and limbs; the posterior lobe being as wide as any part of the sternum, there can be of course but very small wings by which it is attached to the carapace. In fact they are scarcely perceptible. The upper jaw is most frequently hooked and the tail armed with a nail.

THYROSTERNUM.

This genus differs from the preceding in the shape and mode of attachment of the sternum to the carapace, the number of bones and of scutæ is the same, but the wings are much longer; it has likewise two moveable lobes, the anterior attached by suture at the sides and by ligament in the centre; the posterior one entirely by suture, both of them narrower than the opening of the carapace, particularly the posterior one; consequently the animal is not able to withdraw its softer parts entirely from view. It is always emarginate behind, the upper jaw is almost always hooked, and the tail generally armed with a nail. The transitus from *Kinosternum* to *Thyrosternum* is so perfect, that it becomes difficult in some instances to say to which genus a specimen belongs.

OZOTHECA.

Sternum very much shorter and narrower than in the other two genera, constituted in the same manner, but the gular plate is generally very small. It is jointed like the others both before and behind. The upper lobe is quite moveable, but the lower little so, inasmuch as the fourth scuta projects somewhat beyond the suture connecting this part with the abdominals, but there is a wide space above it filled with ligamentous matter, which allows of some degree of motion. This joint early in life becomes immoveable. The anterior joint in old animals is apt to become permanently soldered to the adjoining bone. The wings are longer and narrower than in the others.

The following characteristics are common to all these three genera. The chin is furnished with two or more small warts, and the feet have some folds or large scales, the fore feet on the anterior side, the hind feet on the posterior. They all have a strong musky odor.

Although it may appear perfectly proper to separate the last genus from the two others, yet in Wagler's *K. hirtipes* a very near approach is made to *Ozotheca*, it has a very narrow sternum, emarginate behind and the branchial plate is quadrangular, very much resembling what we see in *O. odorata*, the jugular scuta is large and triangular, the upper jaw hooked, and the tail unguiculate; in these three particulars exactly like the *T. Pennsylvanicum*. In the young of the *O. odorata* it is impossible to distinguish the sternum from that of the *T. Pennsylvanicum*, except by the form of the brachial scuta; it is very remarkable, however, that the first which in the adult state has the nuchal scuta small and irregular in shape, when very young has it very large and perfectly triangular. The most of the *Kinosterna* and *Thyrosterna* have the tail armed with a nail. Whether any of the *Ozothecæ* are thus furnished I do not know, never having had an opportunity of examining more than two species (unless Wagler's *K. hirtipes* is admitted to be one). Should one, however, be found

perfectly agreeing in every respect with the *O. odorata*, with the tail unguiculate, I would not hesitate to say at once, that my learned friend's division was unnatural. In all species that I have seen, except those brought from Mexico by Mr. Pease, the posterior lobe of the sternum is emarginate behind, and is but slightly moveable; in the Mexican species, on the contrary, it is entire and capable of entirely closing up the box of the shell; in both cases the faculty arises from the peculiar formation of the joint, being either sutural or ligamentous.

The following is the distribution according to Mr. Agassiz's system of such *Kinosternoids* as I have had an opportunity of examining.

KINOSTERNUM.

Mexicanum, integrum, triliratum.

THYROSTERNUM.

Scorpioides, leucostomum, longe caudatum, pennsylvanicum, sonoriense and Henrici.

OZOTHECA.

Odorata, guttata, hirtipes?

The animal, the description of which follows, was somehow omitted in my monograph in vol. vii. Proc. A. N. S.; it differs remarkably from others of Mr. Agassiz's genus *Kinosternum*, in having the upper jaw not hooked, and the tail not unguiculate.

K. TRILIRATUM.—Head and neck above spotted with yellow, the spots on the cheeks larger, beneath yellowish irregularly varied with dusky, jaws yellow varied with black, the upper entire, not hooked. Chin with four small warts. Fore legs above dusky, beneath yellowish brown with three plicæ or large scales; hind legs cinereous brown with four large scales near the heel. Tail short, black, pointed, without a nail at the end. Shell regularly oval, brown, very convex, strongly tricarinate on the back, very declivous on the sides, the outer edge of the margin sharp and projecting, the scutæ with more or less concentric striæ, and others radiating from behind. Vertebral scutæ elongated, imbricate, emarginate behind, the first triangular with the apex somewhat truncate and the base angled, applied to the nuchal and first marginal only, the second, third and fourth hexagonal, the anterior and posterior sides very short, the fourth with the two lower sides much shorter than the upper, the fifth triangular with the apex truncate and the base a little angled; the first lateral is four-sided, the lower side with four facets, second and third pentagonal, fourth irregularly five-sided; the nuchal scuta is wider at the base, the rest of the marginals square and oblong, increasing in size to the extremity of the shell: sternum yellow, varied with black, entire and rather pointed behind, bivalved, completely closing up the box of the shell, wings very short, applied partially to the fourth and entirely to the fifth, sixth and seventh marginal scutæ, all the scutæ of the sternum are concentrically striate; the gular large, triangular, pectorals irregularly four-sided, the anterior side curved, brachials triangular with the apices truncate and the base rounded, caudals right angled triangular; inguinal scuta long, rather wide, joining the axillary.

Length of the shell 5 inches, height 2·5, tail ·8. Brought from Mexico by Mr. Pease.

I conclude by observing that Mr. Agassiz thinks my *K. Mexicanum* is the same as Mr. Bell's *K. Shavianum*. The author last named supposed that he possessed the identical specimen from which Dr. Shaw made his figure. There can be no doubt that Dr. Shaw's figure represents my *K. Mexicanum*, although the shell is represented without a nuchal and without caudal marginals. Mr. Bell's species has the sternum narrower than the shell, and emarginate behind; it undoubtedly belongs to the *scorpioides*. In the seventh volume of Proc. A. N. S., in my description of this species, it is said that the sternum is entire; it is really shallowly emarginate. They

both belong to the genus *Thyrosternum*. Mr. Agassiz likewise thinks that my *Emys concinna* and Dr. Holbrook's *E. Floridana* are the same. My friend will pardon me when I say, that he probably has not had an opportunity of examining my species. There is no specimen in the collection of the Academy which I can recognise as the animal once described by me. These two species are by no means alike. The *E. concinna* is most beautifully smooth, nothing can be more so; the *E. Floridana* is extremely rough with longitudinal rugæ, it is besides sometimes three times the size of the other, and the marks on the head and neck are entirely different. According to this excellent naturalist the *K. longicaudatum* and *K. brevicaudatum* of Spix, form but one species. They differ, however; the first has the sternum sharply emarginate behind, and the brachial scuta is narrow, triangular and very much truncate at the apex. In the other the sternum is bluntly emarginate behind and the brachial perfectly and acutely triangular. Mr. Bell's *scorpioides* is not the animal described so long ago under that name, as the want of the caudal nail sufficiently shews; the specific name of this tortoise was given it on account of that appendage. Neither is it the *K. brevicaudatum* nor the *longicaudatum* of Spix. This author thinks that the female tortoises have long and the males short tails; it is just the reverse.

When my son was in Honduras, he obtained a species of tortoise much larger than any that we have seen in the United States. The shell was nearly two feet long; unfortunately this was afterwards destroyed, but the head and limbs having been put into a jar of alcohol reached here in safety. In order to keep alive the remembrance of this animal and to induce others to look for it, I add a description of the head and tail, the only parts to which I can have access at present, premising that it belongs to the genus *Emys* (Ptychemys Agass.) and has the jaws serrate in the same manner as the *E. mobiliensis*.

EMYS VALIDA.—Head and neck above dusky inclining to brown, striped with yellow, the stripes on the top very few, on the sides very numerous, one of them running from the middle of the orbit to the back part of the neck, widens considerably after it passes the superior part of the cheek; beneath yellow with numerous lines of dusky; nose and jaws striped with yellow, jaws serrate, the lower one hooked, the upper emarginate. Tail dusky with two yellow lines on the top and three on the under side, the outer one of which on each side branches off in such a manner as to surround the vent, above which it crosses the tail transversely. Head 4 inches long, tail 3 inches.

Sixty years ago, in the Tammany Museum in New York, there was the shell of an *Emys* three feet long; it had been used by an Indian as a shield and had varied devices painted on it; it was said to come from Lake Erie. Nothing like this has since been seen, but I am told that in the head waters of the Mississippi tortoises of an immense size and in great quantity have been observed.

Since writing the above, Prof. Baird has called my attention to the Atlantic Journal of Mr. Rafinesque, where there are some remarks on the tortoises of the United States. This author names the *Testudo Carolina*, the *Kerobates* of Agassiz, *Gopherus;* his *Cheliphus* appears to be the true *Kinosternum* Agassiz, the *Uronyx* the *Thyrosternum* of the same; *Didicla* is the *Cistudo*, *Chelopus* is *Nanemys* and *Cheliurus* is the *Chelydra*.

Although it has become customary to pay no attention to any thing published by this very indefatigable explorer of the productions of our country, I do not think it right when a genus or a species has been announced as suggested or discovered by him, to pass it over without notice. From an unfortunate shipwreck in which he lost every thing that he possessed in the world, he became disordered in his intellect. Notwithstanding his propensity for seeing differences which were not apparent to others, many of his observations are truly valuable, and no naturalist should think his labors perfect unless he has searched through the many publications of this unfortunate naturalist, and discovered whether or no he had been anticipated by him. No one seems ever to have looked for his *Opalone*, a soft shelled tortoise with five nails, found in the upper branches of the Hudson River.

Geological Explorations in Kansas Territory.

BY F. B. MEEK and F. V. HAYDEN.

As it is merely our purpose, on the present occasion, to give rather briefly, the results of some geological examinations made by us last summer in eastern Kansas, it will perhaps scarcely be expected that we should here enter into a historical review of the valuable labors of other explorers in that region. Hence we proceed at once to present such facts as came under our observation, and the conclusions they seem to warrant.

The route pursued by us while making these investigations, was first from Leavenworth city on the Missouri, accross the country to Indianola, near the mouth of Soldier creek, on the Kansas; thence up the north side of Kansas and and Smoky Hill rivers, to the mouth of Solomon's fork. Here we crossed the Smoky Hill, and followed it up on the south side to a point near the ninety-eighth degree of west longitude; from which point we struck across the country in a south east direction to the Santa Fe road, which we followed north eastward to the head of Cottonwood creek. Leaving the road here, we went down the Cottonwood valley some thirty miles, when we turned across the country nearly due northward to Council Grove. From the latter place we followed the Santa Fe road back southwestward about twenty-four miles to a watering place known as "Lost Spring;" here we again left the road and struck across the country in a northwest direction to Smoky Hill river, at a point nearly opposite the mouth of Solomon's fork. We then traveled down the south side of Smoky Hill and Kansas rivers to Lawrence, where we crossed the Kansas and proceeded in a northeast direction back to Leavenworth city.

The first outcrop of rocks examined by us during the expedition is at a point just below the steamboat landing at Leavenworth city. At this place and for some distance above on the river, the formation is well known to belong to the upper, but not the highest portions, of the great western coal measures.

The section here near the Leavenworth landing, presents the following beds, in descending order:

	Feet.
1. Bluish gray clay, exposing a thickness of about	3
2. Hard gray layer of *Fusulina* limestone	1½
3. Yellow laminated clay	7
4. Hard gray argillaceous limestone with *Fasulina*	1
5. Gray fine grained argillaceous sandstone with fucoidal markings, sometimes contains seams of limestone	1 to 3
6. Gray, green and blue, rather indurated clay, with sometimes near the base many compact concretions limestone	2
7. Hard light yellowish gray limestone, usually of bluish tinge far in beyond the effects of weathering. Contains *Spirifer cameratus, S. Kentuckensis, S. lineatus, Spirigera subtilita, Orthisina Missouriensis, Productus splendens? P. semireticulatus? P. pustulosus* and *Fusulina cylindrica*, together with colums of *Crinoids*, and spines and plates of *Archæocidaris*; also jaws teeth of *Xystracanthus arcuatus*	15
8. Dark shale, passing up into gray less distinctly laminated clay	5
9. Hard dark bluish impure limestone, containing *Fusulina cylindrica, Spirigera subtilita, Productus Rogersi, P. Prattenianus, Arca carbonaria?* an undetermined *Monotis, Allorisma? Leavenworthensis, A. subcuneata, Myalina subquadrata, Leptodomus granosus*, and a large *Belerophon*	1½–2
10. Gray, more or less laminated clay, becoming darker near the upper part, rising above the river	11

Attached to the surfaces of bed No. 9 there is usually from one to two inches of soft dark argillo-calcareous matter containing great numbers of *Orthisina crassa*, with the undetermined species of *Pecten, Mytilus, Schizodus, Pleurotomaria*, &c.

All this section above No. 7 appears to vary considerably, at different places

some of the beds, being entirely wanting, or presenting quite different lithological characters at other localities not far from here. Owing to the dip of the strata, and partly to the fall of the river, the bed of limestone No. 7, which is elevated eighteen feet above the river where this section was taken, rises as much as twenty-five feet above the level of the river, at a distance of one mile or less below; and on following the outcrop of these rocks along the shore above Leavenworth city, they were found to sink gradually beneath the water, so that at Fort Leavenworth landing, two miles above, (in a north direction from the exposure first examined) all of beds No. 8, 9 and 10, as well as two or three feet of No. 7, were submerged. Should this dip continue at the same rate, without local undulations, the whole of No. 7 must pass beneath the river in less than two miles above the Fort.

Immediately above No. 1 of this section, we saw no exposures of rock in place, but on a small stream about two and a half miles below Leavenworth city, and perhaps one and a half miles back from the river, there is an outcrop of soft fine grained yellow sandstone, showing a thickness of twenty-four feet, underlaid by a bed of blue clay of which a thickness of about four feet was exposed. We had no opportunity to determine the elevation of these beds above the river with sufficient accuracy to form a definite conclusion whether or not they hold a position above the section seen near the Leavenworth landing, though we incline to the opinion that they come in above it.

In ascending the hills back of Leavenworth city we observed no outcrops of rock along the slopes, until near the summit, where at an (estimated) elevation of about two hundred feet above the highest bed of the section at the river, there is an exposure of hard bluish-gray impure limestone, weathering to a yellowish tinge, the beds of which are separated at places, by partings of clay. Of this rock we saw a thickness of sixteen feet. It is much used for building purposes and quarried rather extensively back of Fort Leavenworth. At one of these quarries, amongst the loose material thrown out by the workmen we found specimens of *Spirifer cameratus*, *S. Kentuckensis*, *S. planoconvexa*, *S. hemiplicata*, *Spirigera subtilita*, *Productus semireticulatus*, *P. Norwoodi*, *Leptodomus Topekaensis*, *Fusulina cylindrica*, *Terebratula millepunctata*, and fragments of *Crinoids*, with *Chætetes* and *Fenestella* of undetermined species.

Above the quarry there is a slope of some forty or more feet to the summit of the hills, apparently occupied by clays; and the quarrymen informed us that there is immediately under the bed of limestone an eight feet bed of clay, beneath which they had made no excavations.

West of this locality, the surface of the country soon descends gradually into a depression connected on the north with the valley of a small stream flowing into the Missouri above Fort Leavenworth. In this immediate neighborhood the face of the country is slightly inclined to be hilly, but the soil is rich, and the long gentle slopes are clothed in the spring and summer months with a luxuriant growth of prairie grass. From several points near here, we had a fine view of the broad rich valley, with its beautiful groves and scattering farm houses along the little stream to the north of us.

Beyond this, the road after passing over some undulations, ascends to the summit of the country, which is rich elevated prairie land. At several places near the upper part of the slopes some five or six miles from Leavenworth, we met with outcrops of light grey limestone, apparently in ten to twelve inch layers, containing *Fusulina*, *Productus semireticulatus*, *Chætetes*, and small *Cyathophylloid* corals. These beds probably belong to the same horizon as the limestone near the top of the bluffs back of Leavenworth, or may even hold a higher position.

At Big Stranger creek, some fourteen or fifteen miles west of Leavenworth city, the following section was observed in descending order:

	Feet.
1. Slope, without any exposure of rocks,.....	60
2. Layers of limestone, weathering yellowish, containing *Spirifer cameratus* and *Fusulina cylindrica*.....	8

3. Slope probably occupied by shale or clay..... 40
4. Grayish yellow limestone, with *Fusulina cylindrica* and *Spirigera subtilita*..... 5
5. Bluish gray soft shale, or laminated clay with occasional harder sandy seams..... 38
6. Coal immediately overlaid by one inch of *cone-in-cone*..... ½
7. Bluish gray laminated clay or soft shale, extending down to the creek 18

Again, on Little Stranger creek, some twelve miles south west of Leavenworth city, there is a somewhat similar exposure, containing a twenty inch bed of coal. This bed is worked to some extent on the land of Mr. Charles Stone, where the following section may be seen in the descending order :

Feet

1. Light gray, or bluish gray, soft calcareous sandstone with harder layers containing much argillaceous matter, with *Productus splendens? Myalina subquadrata*, an undetermined *Monotis*, and many fucoidal markings; exposing a thickness of..... 15
2. Blue laminated clays more or less arenaceous above..... 26
3. Coal..... 1¾
4. Bluish gray somewhat ferruginous clay rising above the creek..... 4

We have no means of determining what relations the rocks composing these two sections bear to the exposure at Leavenworth, but we think they hold a position between the bed of limestone seen near the top of the hills back of Leavenworth city, and the upper bed of the section near the Leavenworth landing.

Between Big Stranger and Grasshopper creeks, the road passes over a beautiful rich prairie, elevated about 350 or 400 feet above the Missouri. In crossing this prairie we met with no exposures of rock, the whole being covered by heavy Quaternary deposits, into which wells have been sunk at several places, from thirty to seventy feet without striking solid rock *in situ*. At one or two places, however, we saw masses of limestone which had been quarried for building purposes along a little stream two or three miles north of the road. These contained amongst other fossils *Spirifer cameratus*, *Orthisina umbraculum? Fusulina cylindrica*, and fragments of *Fenestella*, with spines and plates of *Archæocidaris*. We had no opportunity to examine the quarry from which this rock was obtained, but were informed that the bed is some sixty or seventy feet below the summit of the higher portions of the surrounding country.

In descending from this elevated prairie into the valley of Grasshopper creek, at Osawkee village, we observed,

Feet.

1. A bed of hard gray limestone near the summit of the slopes, containing great numbers of *Fusulina*..... 8
2. Slope, no rocks exposed, about..... 55
3. Outcrop of *Fusulina* limestone, apparently..... 3
4. Slope, no rocks exposed..... 50
5. Gray or bluish gray limestone, weathering yellowish, containing *Pleurotomaria humerosa*, *P. subturbinata*, and a large undetermined species of *Bellerophon*; also *Allorisma? Leavenworthensis*, *Myalina subquadrata*, *Pinna* undt., *Spirifer cameratus*, *S. planoconvexa* and *Productus æquicostatus*, with great numbers of *Fusulina cylindrica*..... 3
6. Dark gray indurated clay..... 2
7. Rather soft argillaceous limestone..... 4

The fact that several of the fossils seen here in bed No. 4 are the same species found in No. 5, of the section at Leavenworth landing, would seem to indicate that these beds occupy the same geological horizon. It is very difficult, however, to identify the same beds at different localities amongst these formations, in consequence of the fact that the fossils found in them usually have a great vertical range, and exactly similar strata are often repeated in various parts of the series. Should it prove to be the case that they do occupy the same geological horizon, it would show that there is here a gentle eastward

dip; for the lowest bed of this section on Grasshopper creek, cannot be less than 100 feet higher than the base of the section at Leavenworth city.

Still we incline to the opinion that the strata near here, if not almost horizontal, or merely undulating, have a general inclination towards the west, or somewhat north of west, and that the exposure on Grasshopper creek, is composed of much more modern beds than those near the landing at Leavenworth city. At any rate we saw an exposure at Lawrence landing, on the Kansas, composed of ledges of limestone, overlaid by clay, and having a decided dip to the west or north of west, at a rate of not less than fifty feet to the mile. This limestone consists of an upper hard gray layer, about three feet in thickness, resting on a soft gray arenaceous bed, of which some one or two feet were visible above the surface of the river when examined by us. In these beds we saw *Spirigera subtilita*, *Productus splendens?* and *Myalina subquadrata*. Above these, about eleven feet of gray laminated clay were exposed, the upper part of the bed having a more yellowish tinge, and containing more arenaceous matter than the lower.

If these beds continue to rise at the same rate towards the east, they must of course run out on the summit of the highest part of the country not far east of Lawrence; and the same inclination to the west or north west, would take them far beneath the horizon of the base of the section seen on Grasshopper creek.

Above this exposure at Lawrence landing, there is a space of about 160 feet in which no outcrops were seen excepting some red and blue clays near the upper part of the hills, back of the town. Just above these clays, some ledges of gray limestone were seen, apparently altogether about eight feet in thickness, containing *Fusulina cylindrica*, *Spirigera subtilita*, and *Spirifer cameratus*.

West of Grasshopper creek, on both sides of the Kansas, the country becomes lower near the river, but at a distance of some ten or twelve miles back, on the north side, it appears to be nearly as elevated as on the east of Grasshopper creek. Between this higher country and the Kansas, there is a plateau, apparently elevated not more than sixty feet above the broad level prairie bottoms along the river; while on the south of the Kansas, some five or six miles south west of Topeka, there are some isolated hills apparently of the same elevation as the high country north of the Kansas.

At several places soon after crossing Grasshopper creek, we met with some highly fossiliferous beds along the small streams, at an elevation of apparently about eighty feet above the Kansas. Below we give a section of these beds seen at a locality some eight miles south west of the point where the exposures mentioned on Grasshopper creek were observed:

	Feet.
1. Rough seams and layers of concretionary limestone of bluish tinge with partings of clay, containing *Terebratula millepunctata*, *Spirigera subtilita*, *Spirifer cameratus*, *S. Kentuckensis*, *Retzia Mormonii*, *Rhynchonella Uta*, *Productus Norwoodii*, *P. splendens?* *P. semireticulatus*, *P. Prattenianus*, *Orthisina*, similar to *O. umbraculum*, also *Fenestella* and *Chætetes* of undetermined species	4
2. Black shale, shading upwards gradually into laminated blue clay	2½
3. Hard blue or gray limestone, with *Spirifer cameratus*, *Spirigera subtilita*, *Myalina*, *Pecten*, &c.	1
4. Bluish gray soft clay, with seams of hard limestone	3
5. Light gray, somewhat granular limestone with a few round grains, and very small pebbles of quartz	2

At another place on the south side of the Kansas, about twelve miles south west of the point where the last section was seen, there is an abrupt bluff near the old Baptist Mission, composed of the following beds in the descending order:

	Feet.
1. Slope, no rocks exposed	20
2. Hard yellowish gray limestone, with fragments of fossils	4
3. Slope, no rock exposed	18

4. Light gray, rather hard fine grained sandstone..... 3
5. Slope..... 20
6. Fine grained sandstone, in thin layers, not well exposed—apparently 2
7. Slope, with occasional outcrops hard gray limestone 16
8. Yellowish and dark gray laminated clay, or soft shale, with layers and nodular concretions of argillaceous carbonate of iron, near base*..... 90
9. Hard bluish argillaceous limestone, of which there was exposed in the bed of a small stream, not more than 13 or 15 feet above the river, a thickness of 1

After passing this locality, we heard of a coal mine some three or four miles south of here, near the base of an isolated hill, known as Shunganunga Mound. We did not visit this mine, but were informed that it is considerably above the summit of the last section, and that the bed is about 18 inches in thickness. The coal is said to be of good quality.

Above here on both sides of the Kansas, the country continues to be rather low, no part of it being apparently more than two hundred feet above the river. For a long distance above this, there is a beautiful broad, level bottom prairie, on the north side of the Kansas, extending back from four to six miles, and as much as eighteen or twenty miles along the river. Bounding this on the north, the country rises by a gentle grassy slope to an elevation of from sixty to about one hundred feet, furnishing the most beautiful sites for dwelling houses.

For a considerable distance above the locality where the exposure near the old Baptist Mission was examined, the hills especially near the river on the south side, appear to be mainly composed of rather heavy deposits of laminated clays and shales, with soft sandstones and occasional thin beds of limestone, containing the usual fossils of the upper carboniferous series. At the crossing of Mission creek, at an elevation of perhaps not more than twenty-five or thirty feet above the Kansas, exposures were observed consisting first above of five feet of light gray laminated clay, resting upon two or three feet of soft yellow sandstone, which passes down into laminated arenaceous clays, of which some eight or ten feet were exposed above the creek.

Some fifteen or sixteen miles west of the point where the road crosses Mission creek, at a locality six or seven miles south of the Kansas, there is a high elevation known by the name of Buffalo mound, rising as much as four hundred and fifty or sixty feet above the river. At one place a large creek called on the maps, Upper Mill creek, sweeps close along the northern base of this elevation, and has carried away the loose debris so as to leave the lower strata well exposed. The section here beginning at the summit of this hill is,

Feet.

1. A slope of about 160 feet, along the lower forty feet of which we found loose specimens of *Spirifer cameratus*, *S. planoconvexa*, *Retzia Mormonii*, *Productus splendens? Chenctes Verneuiliana*, *C. mucronata*, and *Fusulina cylindrica*, var. *ventricosa*, with fragments of *Chætetes*, *Crinoids*, &c., of undetermined species.....
2. Bluish gray limestone in two layers, the upper of which contains columns of *Crinoids*, *Productus Calhounianus*, &c., while *Myalina subquadrata*, *Orthisina Missouriensis*, *Allorisma*, *Pinna*, *Monotis*, &c., of undetermined species, occur in the lower 3
3. Slope with no exposures of rock..... 96
4. Rather hard mottled brown and light gray compact limestone, with a few *Crinoid* columns; may be thicker, but only showing a thickness of.... 3
5. Brown, whitish and green clays, with rugged white calcareous concretions 4
6. Fine argillaceous sandstone, with streaks of yellow and brown colors.. 1½
7. Ash colored clay..... 10

*There may be some thin beds of limestone in this portion of the section, as every part of this ninety foot bed was not well exposed,

8. Clays of red or brownish colors above; blue and green below..... 3½
9. Deep brown clay, with rugged concretions of same color 3
10. Hard light bluish limestone, with some rather large columns of *Crinoids*, *Chonetes*, *Verneuiliana*, &c..... 2½
11. Brown, ash colored, and blue laminated clays, which are more or less arenaceous, with near the middle some 5 or 6 inches black shale..... 46
12. Gray and purple argillaceous limestone, with *Pinna*, *Productus*, and a few *Fusulina*..... 1½
13. Green laminated clay..... 4
14. Two or three layers of soft fine grained sandstone, more or less argillaceous, and separated by seams of clay..... 2
15. Bluish and ash colored clays..... 21
16. Alternate layers of hard bluish gray limestone, and seams of clay with sandy concretions..... 3
17. Rather hard yellowish limestone, with *Fusulina*..... 2½
18. Ash colored clay, not very well exposed..... 15
19. Yellowish impure limestone with *Fusulina*..... 2
20. Ash colored laminated clays—above the creek..... 5

About three hundred yards below where this section was taken, the creek was observed to fall nearly a foot, over a ledge of hard limestone; and one mile further down, the bed of the creek is composed of a hard yellow limestone containing great numbers of *Fusulina*. At these localities Mill creek is probably not elevated more than thirty feet above the Kansas.

Near half a mile east, or south east, of the point where the *Fusulina* limestone was seen in the bed of Mill creek, and at a somewhat higher elevation, we saw apparently the same bed of *Fusulina* limestone showing a thickness of three feet. Under this there was at one place exposed a thickness of some four or five feet of very fine yellow sandstone with minute specks of Mica. These exposures indicate a moderate dip of the strata towards the west or north west.

On the north side of Kansas, in a direction a little west of north, and about sixteen miles from the last mentioned localities, we observed an outcrop on a small stream marked "Last Creek" on the maps, presenting the following section, descending:—

Feet.

1. Seams yellow magnesian limestone, alternating with clay, showing a thickness of about..... 8
2. Yellow soft granular magnesian limestone, containing *Productus Norwoodi*, and an undetermined species of *Myalina*..... 4
3. Fine laminated black shale..... 1
4. Gray rather soft argillaceous limestone..... 1
5. Blue somewhat indurated very fine calcareous clay containing at its junction with the next bed below, *Chonetes*, *Synocladia biserialis*, *Chætetes*, and fragments of *Crinoids*..... 9
6. Seams hard, compact gray limestone, alternating with softer argillo-calcareous matter, and containing casts of many small *Cypricardia*-like shells, small *Murchisonia*, *Pleurotomaria*, *Macrocheilus*, *Naticopsis*, *Bellerophon*, &c..... 2
7. Bluish laminated clays weathering to drab color..... 4
8. Yellow rather soft granular magnesian limestone, with embedded fragments of harder more compact do..... 5½
9. Bluish indurated calcareous clays..... 3

The base of this section is evidently not elevated much above the Kansas, as it extends down to the bottom of a deep ravine formed by the creek, while its top appeared to be nearly on a level with the surface of the bottom prairie in the Kansas valley. These beds dip a little to the north west, and are very similar, especially the magnesian limestones, to some of the Permian strata holding a position far above this in the series, some considerable distance west of

here. Only about three miles further west, we saw the following exposure on Vermilion creek :—

	Feet.
1. Slope of about fifteen feet, with near the base some ledges of gray limestone, amongst loose fragments of which we picked up specimens of *Spirigera subtilita*, *Spirifer hemiplicata*, *Productus Norwoodi*, and *P. splendens?*...	15
2. Slope, no rock seen	26
3. Soft bluish and gray more or less laminated clays with irregular sandy seams and concretions	12
4. Irregular hard blue calcareous seam one to six inches	½
5. Blue clay	2
6. Soft decomposing more or less laminated sandstone	4
7. Blue clay one foot above the creek	1

Almost directly opposite these localities, on the south side of the Kansas, some three or four miles back from the river, and nearly on a line between the locality where we saw the exposures on "Last Creek" and Buffalo mound,—but considerably below the level of the summit of the latter, we examined some exposures presenting beneath a slope of about eighty feet, in descending order :

	Feet.
1. Hard bluish gray limestone of which there was exposed	1
2. Rough yellowish magnesian limestone with cavities lined with chalcedony	3
3. Bluish and ash colored clays	5
4. Layer much like No. 2	1
5. Yellowish green clay	20
6. Bluish gray limestone in two layers, the upper of which contains columns of *Crinoids*, *Productus Calhounianus*, &c., while *Myalina subquadrata*, *Orthisina Missouriensis*, *Allorisma*, *Pinna*, *Monotis*, &c., occur in the lower	3
7. Bluish and ash colored clays exposing a thickness of	5

The bed No. 6 of this section is evidently the same as No. 2 of the section at Buffalo mound (page 12), though here the dip of the strata has brought it lower. Its elevation above the Kansas at Buffalo mound must be about two hundred and fifty feet. We had no means of estimating very accurately its elevation where the last section was taken, though we do not think it as much as one hundred and seventy-five feet above the Kansas.

Ten miles farther west, on the same side of the river, along a small stream marked "Deep creek" on the maps, at a point some four or five miles back from the Kansas, and elevated perhaps as much as forty feet above it, some outcrops were examined near Zeandale, presenting the following section, descending :—

	Feet.
1. Long slope of about one hundred feet, no rocks seen	100
2. Dark argillaceous limestone, stained with iron, and containing fragments of *Crinoids*	4
3. Soft decomposing argillaceous limestone	2
4. Very hard light yellow compact limestone in one massive bed,—containing great numbers of *Fusulina*, also *Productus Calhounianus*, &c	6
5. Ash-colored laminated clay	22
6. Hard decomposing argillaceous limestone with *Fusulina*	3
7. Blue, green, and ash-colored clay	18
8. Gray argillaceous limestone, with more or less ferruginous matter...	3
9. Light bluish clay somewhat laminated	7
10. White decomposing argillaceous limestone with *Productus Calhounianus*	1

We heard of a bed of coal some four or five miles above this on the same creek, but were unsuccessful in an attempt to find the locality where it crops out. We were informed, however, by Mr. Pillsbury, an intelligent gentleman

living at Zeandale, that the bed is from four to six inches in thickness, and overlaid by about three and a half feet of blue shale, strongly impregnated with alum. Above the latter, he said there is an eight or ten inch layer of dark argillaceous material, weathering to an iron rust color, and containing many nodular concretions,—perhaps of carbonate of iron. From the information obtained in regard to the location and elevation of this coal bed, we are inclined to believe it must hold a position a little below the horizon of the middle of the slope at the top of the foregoing section. It is probably the highest bed of coal in the whole series of this region,—at any rate we saw no indications of coal above it.

About a mile or a mile and a half north of the locality where this coal bed has been seen, the dividing ridge between the Kansas and Deep creek, rises to an elevation of near three hundred and twenty feet above the latter stream at the nearest point. Here at the summit of this ridge there are some thin outcrops of gray and whitish argillaceous limestone, showing on weathered surfaces a somewhat laminated structure, and containing at places large spines of a species of *Archæocidaris;* beneath this there is about two feet of gray fragmentary limestone reposing on a more compact bed of hard gray limestone near three feet in thickness, and often cellular in the middle. Along the slope about one hundred and twenty feet below the horizon of these beds, we found loose specimens of *Spirifer cameratus, Orthisina umbraculum? Rhynchonella Uta, Allorisma, Synocladia biserialis,* &c. Just below these, there were many loose slabs of light yellowish fine grained calcareous sandstone, containing *Productus, Pecten,* and *Fucoidal* markings. About forty-seven feet lower down the slope, and near one hundred and fifteen feet above the level of the Kansas, there is an exposure of light grayish yellow granular limestone, showing a thickness of three feet, in which we only saw fragments of a *Chonetes,* and *Crinoid* columns: large tabular masses of this rock were strewed along the slope for some distance below.

At the mouth of Big Blue river, on the south side of the Kansas, there is an abrupt bluff, along which several slides have exposed many of the beds composing the high ridge mentioned six or seven miles below here. The dip, however, of the strata towards the west, or north west, is so great that the limestone containing spines of *Archæocidaris,* seen on the summit of the ridge below this, at an elevation of about 320 feet above the Kansas, is here, opposite the mouth of Big Blue river, only elevated about 214 feet above the Kansas; consequently the three feet of grayish yellow limestone cropping out 115 feet above the Kansas along the slope of the ridge above mentioned, at the mouth of Blue river, has sunk beneath the level of the Kansas.

This far we have scarcely attempted to draw parallels between the various beds seen by us at different places, in consequence of the fact that our observations were isolated, as must necessarily be the case in a mere reconnoissance, extended over a large area in a short space of time. In addition to this, the group of rocks examined presents no extensive beds of limestone or other hard material, forming well marked horizons, or continuous lines of outcrop, by which the relations between strata seen at different localities could be traced out. This difficulty is also greatly increased by the frequent repetition of precisely similar beds at different horizons in the series, and above all by the great vertical range of the organic remains. Consequently we have preferred to present separately the local sections examined, instead of attempting to construct a continuous general vertical section showing the order of superposition of the various strata. To do this successfully throughout all the various rocks of the whole Kansas valley, would require much more time than we had at our command.

As our examinations along the Kansas and Smoky Hill rivers above this point were made in more detail, where the outcrops were more frequent and continuous, we have, as we believe, been able to trace out the connections and order of succession of the various strata with considerable accuracy. Hence, we give below a general section of the rocks in this region, commencing with

the Cretaceous sandstones on the summits of the Smoky Hills, lat. 38° 30′ N., long. 98°. W., and descending through the various intermediate formations seen along the Smoky Hill and Kansas rivers, to the base of the bluff already mentioned, opposite the mouth of Big Blue river, on the Kansas. It is true, there are a few gaps in this section, where we were unable to see the beds along some of the slopes, but as we know the position in the series, as well as the extent of these gaps, it will be easy to determine, when a greater number of exposures have been examined, the nature of the beds occupying them.

General section of the Rocks of Kansas Valley from the Cretaceous down, so as to include portions of the upper Coal measures.

Feet.

1. Red, brown, and yellowish, rather coarse grained sandstone, often obliquely laminated, and containing many ferruginous concretions; also, fossil wood and many leaves of dicotyledonous trees, some of which belong to existing genera, and others to genera peculiar to the Cretaceous epoch. *Locality, summit of Smoky Hills*..... 60

2. Whitish, very fine grained argillaceous sandstone, underlaid by bluish purple and ash colored clays. *Locality same as preceding*..... 15

3. Long, gentle slope, with occasional outcrops of ash colored red, blue, and whitish, more or less laminated clays, with thin beds of sandstone. *Locality same as preceding, and extending down at places nearly or quite to the bluffs of Smoky Hill river;* thickness about..... 200

4. Red sandstone, with some layers of hard, light gray calcareous, do., and both containing ferruginous concretions. *Locality, bluffs Smoky Hill river, five or six miles above Grand Saline river.* Probably local, thickness seen about..... 15

5. Bluish, red, light yellow, and gray clays, and soft claystones, with sometimes a few thin layers of magnesian limestone. In many places these clays have been traversed in every direction by cracks, into which calcareous and argillaceous matter have found their way, and subsequently become consolidated so as to form thin seams of impure yellowish limestone, which cross and intersect each other at every angle. The red clays are usually less distinctly laminated, contain more arenaceous matter, and often show ripple marks on the surfaces. *Locality, Bluffs along Smoky Hill river, above the mouth of the Grand Saline*..... 60

6. Light gray, ash colored, and red clays, sometimes arenaceous, and often traversed by cracks, filled with calcareous matter as in the bed above,—alternating with thin layers and seams of gypsum. *Locality, near mouth Smoky Hill river*..... 40

7. Rather compact amorphous white gypsum, with near the base disseminated crystals, dark colored do. *Locality same as last*.....4½ to 5

8. Alternations of ash colored, more or less arenaceous clays, with thin beds and seams of gypsum above; towards lower part, thin layers of claystone, and at some places soft magnesian limestone. *Locality same as last*.. 50

9. Rough conglomerated mass, composed of fragments magnesian limestone and sandstone, with sometimes a few quartz pebbles, cemented by calcareous and arenaceous matter; variable in the thickness and probably local. *Locality, south side Smoky Hill river, ten or twelve miles below Solomon's Fork*.....seen 18

10. Bluish, light gray, and red laminated clays, with seams and beds of yellowish magnesian limestone, containing *Monotis Hawni, Myalina perattenuata, Pleurophorous? subcuneata, Edmondia? Calhouni, Pecten* undt. and *Spirigera* near *S. subtilita;* also *Nautilus eccentricus, Bakevellia parva, Leda subscitula, Axinus rotundatus*, and undetermined species of *Bellerophon, Murchisonia, &c. Locality, near Smoky Hill river, on high country south of Fort Riley, as well as on Cottonwood creek*..... 90

11. Light grayish and yellow magnesian limestone, in layers and beds sometimes alternating with bluish and other colored clays, and containing

Solemya, a *Myalina* near *M. squamosa*, *Pleurophorous? subcuneata*, *Bakevellia parva*, *Pecten* undt., and a *Euomphalus* near *E. rugosus;* also, a *Spirigera* allied to *S. subtilita*, but more gibbous, *Orthisina umbraculum? O. Shumardiana*, &c. *Locality, summit of the hills, near Fort Riley and above there; also seen on Cottonwood creek*..... 25 to 35

12. Light grayish yellow, rather granular magnesian limestone, containing spines and plates of *Archæocidaris;* a few fragments of small *Crinoid* columns, *Spirifer* similar to *S. lineatus*, but perhaps distinct; 'also same *Spirigera* seen in beds above, *Orthisina Shumardiana*, *O. umbraculum?* and *Productus Calhounianus*. *Forms distinct horizon near summit of hills in vicinity of Fort Riley, also seen on Cottonwood creek*..... 7 to 8

13. Soft argillo-calcareous bed, apparently local. *Kansas Falls*..... 5

14. Light grayish and yellowish magnesian limestone, containing many concretions of flint, also the same *Spirigera* found in beds above, and *Productus Norwoodi P. Calhounianus*, with *Discina tenuilineata* and an undetermined *Monotis*. *Fort Riley and below, also at Kansas Falls and on Cottonwood creek*..... 38

15. Alternations, bluish, yellowish and brown clays, with a few thin seams of limestone. *Fort Riley, Kansas Falls; also below Fort Riley, and on Cottonwood creek*..... 35

16. Light yellowish magnesian limestone, containing *fucoidal* markings, fragments of small *Crinoid* columns, *Pecten*, *Allorisma*, *Spirigera*, *Orthisina umbraculum? O. Shumardiana*, *Discina tenuilineata*, &c. *Lower quarry at Fort Riley, and at other places above and below Fort R., as well as on Cottonwood creek*..... 4 to

17. Alternations of blue, red, and light gray clays, with sometimes thin layers and seams of magnesian limestone. *Fort Riley*..... 28

18. Light gray and whitish magnesian limestone, containing *Spirigera*, *Orthisina umbraculum? O. Shumardiana*, *Productus Calhounianus*, *Acanthocladia Americana*, and undt. *sp. Cyathocrinus*. Lower part containing many concretions of flint. *Fort Riley and on Cottonwood creek*. Whole thickness about..... 40

19. Brown, green, and very light gray clays, alternating; contains near the upper part fragments of *Crinoid* columns, *Synocladia biserialis*, *spirigera*, *Productus Norwoodi*, *Chonetes mucronata*, *Orthisina Shumardiana*, *Orthisina umbraculum*, &c., with teeth of *Petalodus Alleghaniensis*. *Fort Riley*..... 14

20. Alternations of rather thin layers light yellowish magnesian limestone, and various colored clays; the limestone layers containing *Monotis*, *Synocladia biserialis*, &c. *Locality same as last*..... 33

21. Slope, no rocks seen. *Below Fort Riley*..... 25

22. Whitish, or very light gray magnesian limestone, rendered porous by cavities left by the weathering out of numerous *Fusulina*. This is the highest horizon at which any remains of *Fusulina* were met with. *Some four miles below Fort Riley, along a creek on the south side of the Kansas, and apparently not more than ten feet above it*..... 2

23. Bluish, light gray, and brown clays, with occasional layers of magnesian limestone. *Chonetes mucronata*, *Orthisina umbraculum? Monotis*, *Fusulina*, &c. *Ten miles below Fort Riley*..... 35

24 Hard, very light yellowish gray magnesian limestone, with *Fusulina*, and spines of *Archæocidaris*. Forms a marked horizon near the *same locality as last*..... 6

25. Slope, with occasional exposures, thin layers of *Fusulina*, limestone, and seams of gray limestone containing *Myalina*, *Monotis*, *Pecten* and fragments of *Synocladia biserialis*. *Near same locality as last*..... 36

26. Light gray argillaceous limestone, showing on weathered surfaces a somewhat laminated structure; contains large spines of *Archæocidaris*. *Near Ogden Ferry, and Manhattan*..... 9

27. Gray limestone, often fragmentary, with much clay above; lower part hard, and more or less cellular in middle. *Locality, same as last*..... 5

28. Whitish clays and claystones, with a thin layer of hard compact gray limestone near the middle. *Locality same as last*.... 10

29. Light greenish indurated clays. *Same locality*..... 3

30. Hard, heavy bedded, white argillaceous limestone, containing *Monotis* and *Avicula*. *Ogden Ferry, and below there*..... 5

31. Very thinly laminated dark green shale. *Three miles nearly east of Ogden Ferry, on McDowell's creek; also at Manhattan, on the Kansas*..... 1

32. Light greenish and flesh-colored hard argillaceous limestone, with *Spirifer cameratus*. This is the highest horizon at which we found this species. *Same localities*..... 3

33. Alternations of bluish, green, and red more or less calcareous laminated clays, light gray limestones and claystones, with *Pecten*, *Monotis* and fragments of *Crinoid* columns. *Same localities* 30

34. Alternations bluish, purple, and ash colored calcareous clays, passing at places into claystones, and containing in a thin bed near the middle, *Spirifer planoconvexa*, *Spirigera subtilita*, *Productus splendens? Rhynchonella Uta*, &c. *Locality same as preceding*..... 12

35. Blue, light gray, and greenish clays, with occasional harder seams and layers of claystone and limestone. *Same locality*..... 33

36. Somewhat laminated claystone of light gray color, with more or less calc spar near lower part. *Manhattan*..... 19

37. Alternations of dark gray and blue, soft decomposing argillaceous limestone, with dark laminated clays, or soft shale, containing great quantities of *Fusulina cylindrica*, *F. cylindrica*, var. *ventricosa*, *Discina Manhattanensis*, *Chætetes*, and fragments *Crinoids*; also, *Chonetes*, *Verneuiliana*, *C. mucronata*, *Productus splendens? Retzia Mormonii*, *Rhynchonella Uta*, *Spirigera subtilita*, *Spirifer cameratus*, *S. planoconvexa*, *Euomphalus*, near *E. rugosus* and *Synocladia biserialis*; also *Cladodus occidentalis*. *Locality, same as last*..... 18

38. Soft bluish shale, with yellow laminated arenaceous seams below, containing Fucoidal markings. *Same locality*..... 25

39. Two layers gray argillo-calcareous rock, separated by two feet of dark green and ash colored clays. The calcareous beds contain fragments of Crinoids, Chonetes, and *Myalina* of undt. species. *Same locality as last*... 4½

40. Light greenish, yellow, and gray clays and claystones, extending down nearly to high water mark of the Kansas, *opposite the mouth of Blue River*..... 27

The foregoing general section of the strata seen along the valley of Kansas and Smoky Hill rivers, from the mouth of Blue river to the 98th degree of west longitude, is presented in its present form more with a view of illustrating the vertical range of the organic remains found in these rocks, than as an attempt to group the beds into formations that may be expected to preserve their distinctive lithological characters throughout areas of any great extent. As this has necessarily been done from a knowledge of only a portion of the fossils characterizing these strata, it is quite probable, when more extensive collections are obtained, that it may be found necessary even on this principle, to classify and group the beds somewhat differently. We are also aware that some of these beds probably increase or diminish greatly in thickness, or may even entirely thin out, at no very great distances from the localities where we saw them.

Among the more peculiar features of the series of rocks represented by this general section, and in part by the preceding local sections, may be mentioned first, the great number of thin layers and beds; and secondly, the frequent repetition of similar beds at various horizons. Again, the almost entire absence of heavy massive strata of limestone, or other hard material possessing sufficient durability to form perpendicular escarpments of much extent, is worthy of note. As a general thing, the limestones vary from only a few inches in thickness, to from one to three or four feet, and rarely, as in Nos. 14 and 18, attain a thickness of from thirty-eight to forty feet. Although various light colored laminated clays, and soft argillaceous shaly beds predominate, and

arenaceous material is not unfrequently present, it is somewhat remarkable, that dark bituminous shales and beds of coal are rarely met with, even among the outcrops seen along the Kansas, below the mouth of Blue river, belonging to the upper coal measures, and holding a position below the base of the foregoing general section; while through a considerable thickness of beds belonging to higher portions of the coal measures included in the lower part of this section, as well as through the strata containing Permian fossils above, beds of coal and dark carbonaceous shales appear to be almost, if not entirely wanting.

It will be observed we have in this general section, without attempting to draw lines between the systems or great primary divisions, presented in regular succession the various beds with the fossils found in each, from the Cretaceous sandstone on the summits of the Smoky Hills, down through several hundred feet of intermediate doubtful strata, so as to include the beds containing Permian types of fossils, and a considerable thickness of rocks in which we find great numbers of upper coal measure forms. We have preferred to give the section in this form because, in the first place, the upper Coal measures of this region pass by such imperceptible gradations into the Permian above, that it is very difficult to determine, with our present information, at what particular horizon we should draw the line between them, while on the other hand, it is equally difficult to define the limits between the Permian and beds above, in which we found no fossils.

Beginning near the base of this section, we find we have in great numbers the following well known and widely distributed Coal measure fossils, viz.: *Fusulina cylindrica*,* *Chonetes Verneuiliana*, *Productus splendens*, (or a closely allied species,) *Retzia Mormonii*, *Rhynchonella Uta*, *Spirigera subtilita*, *Spirifer cameratus*, *S. planoconvexa*, and a *Euomphalus* similar to *E. rugosus* of the Coal measures, while the few new and undetermined species associated with these, are, for the most part, also decidedly more nearly allied to Carboniferous than Permian forms. We should here remark, however, that we occasionally met with a species of *Monotis*, allied to the Permian species *M. Speluncaria* and *Synocladia biserialis*, also regarded in the old world as a Permian genus, at horizons far beneath the base of this section, between Manhattan and the Missouri. We even found a single specimen of this *Monotis* as low down as bed No. 9, of the section taken near the landing at Leavenworth City, which must occupy a position several hundred feet below the lowest beds of the above section. Still as this shell is very rare in these lower rocks, and the *Synocladia* is a distinct species from the well known Permian form of the old world, while they are both, at these horizons, associated with great numbers of the common well known Coal measure species we can only regard their presence in these beds as establishing the existence of these genera at an earlier period in this country, than in the old world. This, it seems to us, is more philosophical than it would be to place all this great thickness of strata, with their vast numbers of well known Coal measure species, in the Permian, merely because we also find with these occasionally a few forms which would in the old world be regarded as characteristic of the Permian epoch.

Taking it for granted then, that we have carried this section down far enough to include, not only all the beds containing almost exclusively Permian forms, but a considerable portion of the upper Coal measures, it will be interesting to notice, as we ascend in the series, how far each of the Coal measure species mentioned in the lower part of the section, as well as of a few others that occur above and below, range upwards. Thus we see that *Fusulina cylindrica* var. *Ventricosa*, *Chonetes Verneuiliana* and *Retzia Mormonii* were not met with above division No. 37; while *Spirifer planoconvexa*, *Productus splendens?* and *Rhynchonella Uta*, were not observed above 34, nor *Spirifer cameratus* above 32. *Fusulina*

* In Russia, *Fusulina cylindrica* is said to occur only in the upper part of the lower Carboniferous series; but the fossil generally referred to that species in this country, appears to be confined to the Coal measures. We have some doubts in regard to its identity with the Russian species.

cylindrica, of the slender variety so common in the Coal measures of Kansas and Missouri, was not seen above 22; nor was any species or variety of that genus observed above this horizon.

Apparently, the same species of *Monotis*, mentioned at various horizons far beneath, were occasionally met with in 30, 25, 23, and 20, generally associated with the same species of *Synocladia*, ranging far down into the upper Coal measures. In division No. 19, we again met with the *Synocladia biserialis*, and a *Spirigera* allied to *S. subtilita*, if not identical, along with a new species of *Chonetes* we have called *C. mucronata*, which ranges down into the beds near the base of the section. Along with these, were also *Productus Norwoodi*, and *Orthisina Shumardiana*, both of which are common in the Coal measures far below, and a large *Orthisina* similar to *O. umbraculum*, but apparently more finely striate.

Ascending through the intermediate beds to No. 12, we continue to meet with nearly all the species mentioned in 19, with the exception of *Chonetes mucronata*. We also have, first in 18, a large species of *Productus*, called *P. Calhounianus* by Professor Swallow; very similar to some varieties of *P. semireticulatus*, but thought by Prof. S., to present well marked internal differences. There is likewise added in 16, a large *Allorisma* and a *Spiriger* similar to *S. subtilita*, but much more gibbous; and in 14, *Discina tenuilineatus*, together with apparently the same *Monotis*, so often mentioned below. In 12, we also have added a small *Spirifer*, similar to *S. lineatus*, but perhaps more nearly allied to the Permian species *Martinia Clannyana*, King.

The succeeding bed above, No. 11, appears also to contain a mingling of Permian with Coal measure forms, for we have in it the following Permian types, viz.: *Myalina* very similar to *M. Squamosa*, *Pleurophorus ? subcuneata*, *Bakevellia parva* and *Monotis Hawni* along with a *Euomphalus* near *E. rugosus*, the same gibbous *Spirigera*, similar to *S. subtilita*, *Orthisina umbraculum?* and *O. Shumardiana*.

On passing into the next division above, No. 10, we find we have lost sight of all the characteristic Carboniferous forms, unless the *Spirigera* mentioned in some of the beds below be regarded as only a variety of *S. subtilita*, from which however, we think it specifically distinct; for with this exception, nearly all the fossils seen by us in this division, are such as would be regarded as Permian types. Although the number of *species* found by us in No. 10 is not great, *individual* specimens are often numerous. Above this horizon we saw no more fossils through a great thickness of various colored clays, claystones, &c., until ascending to the Cretaceous sandstones crowning the Smoky Hills.

If we do not admit the existence in this region of an intermediate group of rocks, connecting by slight gradations the Permian above, with the Coal measures below, and must draw a line somewhere, below which all is to be regarded as Carboniferous, and all above as Permian, we should certainly, upon palæontological principles alone, carry this line up as far as the top of division No. 11. The passage from the Carboniferous to the strata containing Permian types, however, is so gradual here, that it seems to us no one, undertaking to classify these rocks without any knowledge of the classification adopted in the old world, would have separated them into distinct *systems*, either upon lithological or palæontological grounds, especially as they are not, so far as our knowledge extends, separated by any discordance of stratification, or other physical break.* Indeed the fact that some of the Permian types occurring in No. 10, were first introduced in beds below this, containing many Carboniferous species, would seem to indicate that even No. 10, may possibly

* We have been informed by Dr. J. G. Norwood, former State Geologist of Illinois, that the rocks in that State, referred by him and others to the same epoch as the Kansas Permian beds, rest unconformably upon the Coal measures. This, however, would be impossible in Kansas, since no disturbances of the strata occurred there, until after the close of the Cretaceous era, which would, of course, not only cause the Cretaceous and Carboniferous, but all intermediate beds, to dip at the same angle.

have been deposited just before the close of a period of transition from the conditions of the Carboniferous, to those of the Permian epoch.

The apparent absence of fossils in the beds above No. 10, renders it impossible, with our present information, to determine with certainty the upper limits of the series containing Permian forms. It is true, there is at places a kind of conglomerated mass, occupying the horizon No. 9, which might appear to form a natural line of division between the beds containing the Permian fossils, and those above, in which we found no organic remains; but this seems to be local, and although there is a new feature presented by the zone of gypsum deposits above it, we find between the beds and layers of gypsum, and far above the horizon at which they occur, bluish, greenish, and other colored clays, not only similar to those between the beds and layers of limestone containing the Permian fossils in division No. 10, but also precisely like the laminated clays between the beds of limestone of the upper Carboniferous series far below. Again, in these clays of the gypsum zone, as well as through a considerable thickness of clays above it, there are occasional seams of claystone, which sometimes pass into seams of magnesian limestone, exactly like some of those containing Permian fossils, in division No. 10. We saw no fossils in these seams amongst the gypsum bearing beds, nor higher in the series, but it is probable they may yet be found in some of the more calcareous portions.

Another fact apparently indicating some kind of relation between the gypsum-bearing beds, as well as some of the higher deposits, and the rocks below, is, that we often find both in the clays between the beds of gypsum, and those between the limestone containing the Permian fossils, the same peculiar appearance caused by the cracking of the clays and subsequent infiltration of calcareous matter, seen in division No. 5. At some places the thin plates of limestone formed by the impure calcareous matter filling these cracks, may be seen ramifying through some rather thin beds of these clays in all directions, so as to cross and intersect each other at every angle. Where beds of this kind have been exposed for any length of time along near the tops of bluffs, the softer clays filling the interstices, often weather out, so as to have a curious cellular mass, with the numerous angular cavities.

From these facts we are inclined to suspect,—though we are fully aware that it is a question which can only be determined upon evidence derived from organic remains,—that not only the gypsum-bearing deposits, but a large portion, if not all, of division No. 5, belongs to the same epoch as the beds containing the Permian fossils below.

Between No. 5, and the Cretaceous above, there is still a rather extensive series of beds in which we found no organic remains; these may be Jurassic or Triassic, or both, though as we have elsewhere suggested, we rather incline to the opinion that they may prove to belong to the former. As we have fully discussed the question in regard to the Cretaceous age of the highest division of the foregoing section in a paper read before the Academy in December last, and in an article in the American Journal of Science, January, 1859, it is unnecessary for us to add any thing further on that subject here.

As already stated, our observations along the Kansas valley, to within twelve or fourteen miles of the mouth of the Big Blue river, were too isolated to determine in all cases the relations between outcrops seen at different places. Consequently, although we saw at several points along this part of the valley, indications of a westward or north-westward inclination of the strata, we were left in some doubt whether or not there is a general inclination of the rocks in that direction, between Wabounse and the Missouri. Above this point, however, our observations being more connected, and the exposures more continuous, we were able to determine very satisfactorily that there is at least from near Wabounse, a uniform dip towards the west or north-west, so that in ascending the Kansas valley from this region, we are constantly meeting with more and more modern rocks, as those we leave behind pass beneath the level of Kansas.

To illustrate this more clearly, we would, in the first place, remark that a bed of light greyish yellow granular magnesian limestone, mentioned on page 12, as occupying a horizon about 115 feet above the Kansas, two or three miles west of Zeandale, passes beneath the level of Kansas before reaching the mouth of the Big Blue river, a distance of near seven miles; while another bed (No. 26 of the foregoing section) seen on the very summit of the hills two or three miles north of Zeandale, at an elevation of about 320 feet above the Kansas, was observed opposite Manhattan at the mouth of Big Blue river, only some 214 feet above the Kansas. Again, bed No. 12 of the foregoing general section, which was seen at a locality nearly opposite Ogden, at an elevation of about 363 feet above the Kansas, is at Fort Riley, eight or nine miles further west, elevated only some 215 feet above Kansas. Above Fort Riley this bed forms a marked horizon, and can be followed by the eye without interruption for several miles along the hills on both sides of the river. We observed it gradually sinking as we ascended the Kansas valley, until at a point on Chapman's Creek, some fifteen miles a little south of west from Fort Riley, we saw it nearly down on a level with the Kansas; beyond this it was not again met with on the north side of the Kansas, but we saw it at somewhat higher elevations on the south side of the river a little west of this.

As the distance by an air-line, from the locality nearly opposite Ogden, where this rock occupies a horizon at an elevation of 363 feet above the Kansas to the mouth of Chapman's Creek, is about 23 miles, the dip would appear to be not far from 15½ feet to the mile. It must be borne in mind, however, that the average fall of the Kansas,—at least below Fort Riley,—according to the Barometrical observations of Col. Fremont and others, is near one and a half feet to the mile, and that if we assume the distance by the windings of the river between Chapman's Creek and Ogden, to be about thirty miles, it would make the elevation of the Kansas at the former locality some forty-five feet greater than at Ogden, which would reduce the dip to a fraction less than 14 feet to the mile. Still as the direction of the dip in this region is to the *north* of west, and the direction of the mouth of Chapman's Creek from Ogden is considerably *south* of west, it is probable the inclination of the strata here is greater than the above figures would indicate, and that it may not be less than twenty feet to the mile, in a north-west direction.

From the foregoing statements it will be seen that in consequence of the dip of the strata to the north-west, and in some slight degree to the fall of the Kansas and Smoky Hill rivers, the whole of the foregoing general section below No. 12 passes beneath the level of the Smoky Hill, between the mouth of Blue river and Chapman's Creek. Consequently, the limestones of the succeeding beds above being thinner and less durable than those below, and separated by heavy beds of clay; we find, as might be expected, that the country here in the region of the mouth of Chapman's Creek, is much lower than at Fort Riley and below.

On reaching the mouth of Solomon's Fork, we found the face of the country characterized by long gentle grassy slopes, no part of it near the river being apparently elevated more than about 60 or 70 feet above its surface. A short distance beyond this, we caught the first glimpse of the Smoky Hills, which were seen in a direction a little south of west from us, rising above the surrounding low country like dark blue clouds above the horizon. On approaching these, we found them always situated several miles back from the river, and rising some three hundred and fifty feet above it. The immediate bluffs of the river here, are generally composed of divisions No. 4 and 5 of the foregoing general section, and that portion of these [illegible] above the level of the summits of the bluffs along the river, is made up [illegible] Nos. 3, 2, 1, of the same section. On the south side of the river [illegible] but a comparatively thin capping of the sandstone [illegible] we saw it showing a thickening on some of [illegible]

From some of these hills on [illegible] tween it and the Grand Saline, we had [illegible] nd-

ing country. In the north and north-west, many similar hills were in sight, and as the dip of the strata here is in that direction, it is probable some of this are not only chiefly made up of the sandstone No. 1, but surmounted by the other Cretaceous beds Nos. 2 and 3 of the Nebraska Cretaceous series; indeed, Dr. Engleman found all these formations occupying this relation on Republican river, not more than seventy miles north of this.*

Although this paper is merely designed to give a brief sketch of the leading geological feature of those portions of north-eastern Kansas visited by us, we cannot close it without alluding to the truly great agricultural and other natural resources of this new and interesting Territory. We mean no disparagement to other portions of the Mississippi valley, when we state, that after having travelled extensively in the Great West, and after having seen many of its most favored spots, we have met with no country combining more attractive features than Kansas Territory. Her geographical position gives her a comparatively mild and genial climate, intermediate between the extremes of heat and cold, while the rich virgin soil of her beautiful prairies is admirably adapted to the growth of all the great staple grain and root crops of the west.

It is true that in some districts there is rather a deficiency of timber, but as a general thing there is along the streams sufficient for the immediate wants of the country. In addition to this, the wonderful rapidity with which forests are known to have sprung up on similar prairie lands in Missouri, as the country became settled so as to keep out the annual fires, shows that the present scarcity of timber should not be regarded as presenting any serious obstacle to the settlement of the most extensive prairie district in Kansas.

Before going out into the interior of the Territory, we had expected to find the whole country immediately west of Fort Riley comparatively sterile; on the contrary, however, we were agreeably disappointed at meeting with scarcely any indications of decreasing fertility as far as our travels extended, which was about sixty miles west of Fort Riley. Here we found the prairies clothed with a luxuriant growth of grass, and literally alive with vast herds of Buffalo that were seen quietly grazing as far as the eye could reach in every direction. Even on the high divide between the Smoky Hill and Arkansas rivers, south of this, we found the soil rich and supporting a dense growth of grass; and from all we could learn from persons who have gone further out, the same kind of country extends for a long distance beyond this, towards the west. Hence we infer that the belt of unproductive lands between the rich country on the east, and the eastern base of the Rocky Mountains on the west, is much narrower than is generally supposed; and even this so-called desert country is known to possess a good soil, which may be rendered fruitful by artificial irrigation.

In regard to the mineral resources of Kansas, we have at present only time and space to say a few words. As already stated, coal is known to exist, though its extent is not yet fully determined, at several localities in the region of Leavenworth City, while the geological structure of the country, as well as discoveries already made, warrant the conclusion that this important and useful mineral abounds at many localities south of there. Limestone suitable for building purposes, and the production of quicklime, exist throughout large areas, while inexhaustible beds of gypsum are known to occur at several places not far west of the mouth of Solomon's river. Near this place we likewise saw in the lower Cretaceous rocks crowning the summits of the Smoky Hills, deposits of iron ore, but were unable to determine in the limited time at our command, whether or not it exists in large quantities.

Of the discoveries of gold in the mountains on the western borders of Kansas, much has been said; nothing, however, but a thorough geological survey, by authority of the Territorial or State government, (for Kansas must soon be a State,) can lay before the public such full, accurate, and reliable information on these subjects as will bring from the older States the capital, skill and enterprise necessary to develop the great natural resources of the country.

* See Report of Secretary of War, Dec. 5th, 1857, page 497.

NOTE.—It affords us much pleasure to acknowledge here our obligations to Prof. Henry, of the Smithsonian Institution, for free access to the extensive series of books on Geology, Palæontology, &c., in the Smithsonian Library, while investigating these and our former collections from the west: also for the use of rooms in the Institution, and for many other favors of great value to us.

We are likewise under especial obligations to Capt. Stewart Vanvliet, and Mr. Levi Wilson of Fort Leavenworth, for favors while out in Kansas, without which we could have accomplished nothing: we also received many civilities from Major Sedgwick, Dr. T. G. Madison, Capt. W. S. Walker, and other officers of the army at Fort Riley.

List of the species mentioned in this paper with some remarks on the synonymy, and references to the works, in which they are described.

FORAMINIFERA.

Fusulina cylindrica, Fischer, Oryct. Moscow, p. 126, p. 18, fig. 1—5.

In Russia this species is said to occur only in the upper part of lower carboniferous or mountain limestone. Yet the species usually referred to *F. cylindrica* in this country, so far as our knowledge extends, is not found below the coal measures. From this fact, and some slight differences we observe between our specimens and the figures of the Russian species, we suspect a careful comparison of good specimens may possibly prove them to be distinct. Ranges in Kansas from division No. 22, of the foregoing section, far down into the coal measures. Found at numerous localities between Manhattan and the Missouri, usually in great numbers.

Fusulina cylindrica, var. *ventricosa*, Meek and Hayden, Proc. Acad. Nat. Sci. Phila. Dec. 1858, page 261. Division No. 37, of foregoing general section at Manhattan on the Kansas, and at Juniata on big Blue river.

BRYOZOA.

Synocladia biserialis. Prof. Swallow refers this species with doubt to *S. virgulacea*, Philips, sp. in Transactions Acad. Sci. St. Louis, vol. 1, p. 179, and points out some of the characters in which it differs, stating at the same time, in case it should prove to be distinct, that *biserialis* would be a good specific name for it. We regard it as quite distinct from Phillips' species, not only in scarcely ever having more than two rows of cellules, but also because the ?gemuliferous vesicles, instead of being merely "tubercular and open at the summit," have the form of short, but distinct spines apparently closed and rather obtusely pointed at the apex. The branches or connecting process are likewise less distinctly angulated between the longitudinal stems, than in *S. virgulacea*. Occurs at Fort Riley in No. 19 of foregoing general section, and at various lower horizons on the Kansas below there, down into the upper coal measures.

Acanthocladia Americana. In the Trans. Acad. Sci. St. Louis, vol. 1, p. 180, Prof. Swallow refers this species with a query to *A. anceps*, Schlot. sp. and remarks that it differs from that species in having "the rows of cellules diagonal to the axis of the stems, instead of longitudinal, as represented by King, and on ridges like that figured by Goldfuss." He also further remarks that "it is less regularly branched, and not so distinctly pinnated as those delineated by Goldfuss and King." In the specimens in our collection, the cellules are more numerous, and much more crowded, than in *A. anceps* as figured by King The specific name *Americana*, was suggested by Prof. Swallow.

We found this species in Division No. 18, of the foregoing general section, on Cottonwood Creek.

ECHINODERMATA.

Cyathocrinus —— ? A few scapular plates bearing some similarity to those of *C. ramosus*, Schlot. sp. were met with by us in division No. 18, but they are proportionably much thicker, and the articulating surfaces quite different.

Cottonwood Creek.

Archæocidaris —— ? In No. 12, we found spines and detached plates of apparently an undescribed species of this genus, but they were too much weathered to show clearly the specific characters. The spines are rather slender, terete, nearly straight, and provided with short scattering spinous processes, directed rather obliquely outwards and forward.

Cottonwood Creek.

Archæocidaris —— ? The spines of this species are much larger than the last, and apparently destitute of spinous processes. They are as much as from three to four inches in length, nearly or quite straight, and not flattened or compressed.

Division No. 26, Manhattan and in same position on Cottonwood Creek.

BRACHIOPODA.

Discina tenuilineata n. sp.—We have only seen the lower valve of this species, which is extremely thin, nearly orbicular, and provided with a narrow perforation extending from very near the centre about half way out to the margin. The inner surface is ornamented by distant, extremely slender, distinctly elevated lines of growth, arranged concentrically around a point very nearly in the middle of the valve. The apex of the upper valve was probably nearly central. Diameter 0·50 inch.

Locality and position.—Cottonwood Creek, division No. 16.

Discina Manhattanensis n. sp.—Shell rather small, nearly circular; upper valve moderately elevated, apex rather obtusely pointed, located a little less than half the diameter of the shell from the posterior edge. Surface black and shining, marked by fine closely set concentric lines. Lower valve unknown. Greater diameter from 0·32 in. to 0·46.

Found in great numbers in division No. 37, opposite Manhattan, on Kansas river.

Productus splendens (?), Norwood and Pratten, Jour. Acad. Nat. Sci. Phila. N. S. vol. 3, pl. fig. 5. We refer this shell to the above species with some doubt; it is always smaller than the figure given by Norwood and Pratten, and rather more convex over the visceral region of the larger valve, while the smaller valve appears to want the band-like flattening around the border mentioned in the description of *P. splendens*. The ears extend beyond the body of the shell, are distinctly vaulted, and rarely have more than one spine on each, often none. The spines, however, are more numerous over the surface of the larger valve, being in this respect more like *P. muricatus* N. and P., but both valves want the concentric wrinkles represented in the figures of that species.

This neat little *Productus* is found in great numbers between Fort Riley and Manhattan, as well as at the latter place, in Division No. 34; also at various horizons below that in the upper coal measures of Kansas.

Productus Norwoodi, Swallow, Trans. Acad. Sci. St, Louis, vol. 1, p. 182. A few specimens of this species in our possession have the extreme point of the beak of the larger valve flattened or truncate, as though it had in the young state been attached to some marine body by that part of the shell. We have also in several instances found other shells associated with this species, with small discs not more than 0·20 inch in diameter, attached by the whole surface, as well as by a series of small spines seen radiating from the margin. May not these little bodies be the young of this species?

We think the specimen figured by Prof. Marcou in his work on the Geology of North America, plate 6, fig. 1, as *P. pustulosus*, is the same as the above species, and quite distinct from *P. pustulosus*. It occurs in Kansas at various horizons from No. 14 far down in the upper Coal measures. We found it at Fort Riley and numerous places between there and the Missouri, as well as at Leavenworth city.

Productus Rogersi, Norwood and Pratten, Jour. Acad. Nat. Sci. Phil. N. S. vol. iii, page 9, pl. 1, fig. 3. This species is nearly related to the last, and when the shell is exfoliated, may be easily confounded with it. *P. Norwoodi*, however, appears never to have the distinct concentric wrinkles of this species, nor do the pustules, at the base of the spines have the tendency to elongate into indistinct ribs as in *P. Rogersi*. Prof. Marcou has figured in N. Am. Geol. pl. 5, fig. 6, as *Productus scabriculus*, a shell very like this.

Kansas valley below Mouth Blue river, in upper Coal measures.

Productus pustulosus (?) Phillips' Geol. Yorkshire, vol. 2, p. 316, pl. 7, fig 15. We have a specimen agreeing very nearly with this species in its external markings, but it is much narrower, and the beak of the larger valve more extended, in which respect it differs quite as much from *P. punctatus*.

Near Steam Boat Landing at Leavenworth city, in Coal measures.

Productus Prattenianus, Norwood, Jour. Acad. Nat. Sci. Phil. N. S. vol. 3, p. 17, pl. 1, fig. 10. In Coal measures at Indian creek and at Leavenworth city.

Productus Calhounianus, Swallow, Trans. Acad. Sci. St. Louis, vol. 1, p. 181. This fine large shell is scarcely distinguishable from *P. semireticulatus* var. *antiquus*, but Prof. Swallow, who has seen the interior, thinks it presents well marked internal differences. It occurs in No. 12 and below, at Fort Riley, also on Cotton-wood creek. Prof. S. thinks it even ranges down into the lower Carboniferous.

Chonetes Verneuiliana, Norwood and Pratten, Jour. Acad. Nat. Sci. Phila. vol. 3, p. 26, pl. 2, fig. 6, N. S. Occurs in Kansas in division No. 37, at Manhattan, and perhaps in upper Coal measures at lower horizons.

Chonetes mucronata, Meek and Hayden, Proceed. Acad. Nat. Sci. Phila. Dec., 1838, page 262. Lower part of the section at Fort Riley, (division 9) and down near the base of the foregoing general section, also in same position on Cottonwood creek.

Orthisina crassa, Meek and Hayden, Proceed. Acad. Nat. Sci. Phila. Dec. 1858, p. 261. Occurs in Coal measures near landing at Leavenworth city.

Orthisina umbraculum? Schlot. sp. Petrefakt. 1, p. 256, et 2, p. 67. We find in Kansas, ranging from 16 to 19 of foregoing sections, many specimens of a large species of *Orthisina* having almost exactly the form and other characters of *O. umbraculum*, excepting that the striæ appear to be more numerous. According to Koninck that species has about 108 striæ on each valve, while on our Kansas specimens, we count from 160 to 200; consequently we suspect it may be a distinct but closely allied species; if so, we would propose to designate it by the name of *O. multistriata*. We found it at Fort Riley and at several localities between there and Blue river; also in same position on Cottonwood creek.

Orthisina Missouriensis, Swallow, Trans. Acad. Sci. St. Louis, vol. 1, p. 219. This is a very peculiar plicated species, often much distorted. When partly embedded in the matrix, it frequently bears a striking resemblance to *Plicatula striato-costata*, Cox, 3d vol. Dr. Owen's report on the Geol. Survey of Kentucky, page 558, pl. 8, fig. 7, of Atlas. Common in the upper Coal measures of Kansas, at Leavenworth city and west of there.

Orthisina Shumardiana, Swallow, Trans, St. Louis Acad. Sci. vol. 1, p. 183. Although like the last, a plicated species, this is more symmetrical, and presents other well marked differences. Ranges from No. 11, down some distance in upper Coal measures. Found at Fort Riley and between there and Blue River.

Terebratula millepunctata, Hall, Pacific Rail Road Report, vol. 3, p. 101, plate 2, figs. 1 2. We have the impression that this species is probably identical with *T. bovidens*, Morton (Silliman's Jour. vol. 29, p.) from Ohio. Our Kan-

sas specimens appear, however, to be more elongated than those figures by Dr. Morton, and may be distinct. In form they resemble very much some varieties of *Epithyris elongata*, Schlot. sp. as figured by King, in Perm. Fos. Eng. pl. vi., particularly the narrower varieties, such as fig. 35. The beak of our Kansas shell, however, is not truncate but pointed, the perforation being on the outside, and a little removed from the extremity. If it is identical with *T. bovidens*, Morton's specific name will have to take precedence, being the older. It remains to be determined whether its internal characters agree with *Terebratula*, as now restricted.

This is a rather common form in the upper Coal measures of Kansas, and southward. We found it near the summit of the hills back of Leavenworth city, also at Indian creek near Indianola, &c.

Rhynchonella Uta. (*Terebratula Uta*, Marcou, Geol. N. A., p. 51, pl. vi. fig 12.) We have from the upper Coal measures in Kansas many specimens of a species agreeing exactly with Prof. Marcou's description of the above species. These we suspect may possibly go into the genus *Camerophoria*, King, if not into *Rhynchonella*; at any rate they are certainly not *Terebratula*. We are inclined to the opinion that a shell described by Prof. Swallow, in the Trans. Acad. Sci. St. Louis, vol. 1, page 219, under the name of *Rhynchonella* (*Camerophoria*) *Osagensis*, may be identical also with the above; yet Prof. S. says his species has from "two to six" plications in the sinus of the dorsal valve, while in the shell before us, of which we have quite a number of specimens, there are *invariably* but two plications in the sinus.

Quite common in division No. 94 at Manhattan and at several localities between there and the Missouri, in the Upper Coal Measures. Prof. Marcou, cites it as a mountain limestone species, but we know nothing of its existence in rocks of that age.

Retzia Mormonii. (*Terebratula Mormonii*, Marcou, Geol. N. A., p. 51, pl. vi., f. 11.) We found this species quite abundant in division 37, at Manhattan, where it is associated with the last. It also ranges far below this in the upper Coal measures between Manhattan and the Missouri, being quite common near the summits of the hills back of Leavenworth city. Dr. B. F. Shumard has described a species in the Trans. Acad. Sci. St. Louis, under the name of *Retzia punctilifera*, which we suspect may possibly be a variety of the above; but as he describes it as having usually in the dorsal valve "a moderately wide, shallow sinus, which extends from the front nearly to the beak," and the species before us, of which we have many specimens, has no traces of a sinus, we are left in doubt. In other respects his description agrees exactly with our shell, and he also states that he has it from K. T. Prof. Marcou found this species at the Salt Lake City, Utah, in a rock he refers to the mountain limestone. We have never seen it from below the Coal measures.

Spirifer Kentuckensis, Shumard, Geol. Survey of Missouri, part 2, page 203. Found in upper Coal Measures near the top of bluffs, back of Fort Leavenworth, also near the landing at Leavenworth City, and at other localities between the Missouri and Blue river.

Spirifer cameratus, Morton, American Jour. Sci. vol. 29, p. 150, plate 11, fig 3. This is the same species—as has been determined by Prof. Hall,—described by Dr. Roemer as *S. Meusebachanus*. (Kreid von Texas, p. 88, pl. xi. fig. 7) and subsequently by himself as *S. triplicatus*, in Stansbury's Rept. p. 420, pl. iv. fig. 5. Prof. Marcou has recently figured it in his work on the Geol. North America, page 49, pl. viii. fig. 3, as a variety of *Spirifer striatus*, Martin, from which it is quite distinct. He found it at Pecos Village in a rock he refers to the lower Carboniferous or mountain limestone. It has a great geographical range, being common in the coal Measures from Pennsylvania to the Rocky Mountains, and from Nebraska to New Mexico; we have never seen it, however, from lower Carboniferous rocks.

Spirifer hemiplicata, Hall. Stansbury's report, p. 409, pl. 4, fig. 3. Upper Coal Measures near summit of hills back of Leavenworth, and at other localities between there and Blue River.

Spirifer lineatus. *Anomites lineatus*, Martin. *Spirifer lineatus* of Phillips. Geol. Yorks., 2, p. 219, pl. 10, fig. 17, and of other authors. We have, from near Leavenworth landing, in the coal measures, a Spirifer, apparently identical with the above. It appears not to range very high in the upper coal measures of Kansas.

Spirifer ——. In division No. 12, above Fort Riley, we found a few imperfect specimens of a small, smooth *Spirifer*, similar in some respects, to *S. lineatus*, but apparently more like *Martinia Clannyana*, King, from the Permian of England.

Spirifer planoconvexa, Shumard. Geol. Report, Missouri, 2d part, p. 202. We found this handsome little shell quite abundant in the upper coal measures (divisions 34 and 37,) at Manhattan; also at Juniata, on Big Blue River, and near summit of hills, back of Leavenworth City.

Spirigera subtilita. (*Terebratula subtilita*, Hall. Stansbury's Report, p. 409, pl. 4. fig. 1–2.) *Spirigera subtilita* of Dr. George Shumard. Trans. St. Louis Acad. Sci., vol. i.

This is a very abundant species in Kansas; we found it ranging up, at least as far as division No. 37, at Manhattan, and met with some obscure forms resembling it, still higher in the series. From these horizons, it ranges far down in the other members of the coal measures. Several of our specimens collected at Leavenworth City, show that it was provided with internal spiral appendages, as in the *Spirifer*, and consequently cannot remain in the genus *Terebratula*, as now restricted. It has a wide geographical range, and is almost everywhere the companion of *Spirifer cameratus*. Prof. Marcou figures it in his work on the Geology of North America, pl. vi. fig. 9, from a formation in the Rocky Mountains, which he refers to, the lower carboniferous; but we have never seen it from any position below the coal measures.

Spirigera ——? At Fort Riley, and above there, as well as in the same position on Cottonwood Creek, we found, ranging from division 18 up to 10 of the foregoing section, a *Spirigera* resembling *S. subtilita*, but much more gibbous in form; it also appears to have a much thicker shell. If distinct from *S. subtilita* this might be designated by the specific name *gibbosa*.

LAMELLIBRANCHIATA.

Monotis Hawni, Meek and Hayden. Trans. Albany Inst., vol. iv., March 2, 1858. Prof. Swallow thinks this species not distinct from *M. speluncaria*, Schot sp. Although, like that species, it is quite variable, and some of its varieties are very similar to it; after a careful comparison of a large number of individuals with King's figures and descriptions, we still regard it as distinct. We have never seen any of its various forms with the beak of the larger valve elevated so far above the hinge, as in fig. 5, 6, 7 and 8, pl. 13, of King's work. Nor do any of our specimens possess the peculiar oblique posterior sulcus, seen in the figures cited above. High Country, south of Kansas Falls; also above there, on Smoky Hill River and Cottonwood Creek, in division 10.

Myalina (*Mytilus*) *perattenuata*, Meek and Hayden. Trans. Albany Inst., vol. iv., March 2d, 1858. Our description of this species was made out from one of the more slender varieties of this shell, sent to us from near Smoky Hill River by Mr. Hawn. We were probably wrong, however, in refering to it a specimen in our possession from a locality on the Missouri, opposite the northern boundary of Missouri; and we even suspect the rock from which this latter specimen was obtained may belong to an older epoch.

The species above cited, is we think identical with *M. permianus* of Swallow, Trans. Acad. Sci., St. Louis, vol. i. p. 187. And we also suspect the form he describes in the same paper, as *Mytilus* (*Myalina*) *concavus*, is only a broader va-

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riety of the same; at any rate, we have these two forms, and every intermediate gradation between them, from the same bed. Locality and position same as the preceding.

Myalina squamosa. (*Mytilus squamosa*, J. de C. Sowerby. Morris's Catalogue, p. 93. *Myalina squamosa* of some other authors.)

Of the form, we refer with doubt to the above species; we have but one imperfect specimen. As far as the characters can be made out, it agrees with this species. We found it in division No 11, at Kansas Falls, above Fort Riley.

Myalina subquadrata, Shumard. Missouri Geol. Rept., 2d part, p. 207, pl. c., fig. 17. Upper coal measures, Leavenworth City, on the Kansas, at Lawrence and other localities in Kansas Valley, below mouth of Big Blue River.

Edmondia? Calhouni, Meek and Hayden. Trans. Albany Inst., vol. iv., March 2, 1858. We are still in doubt in regard to the generic relations of this species, having procured no better specimens than that first described by us. We suspect it may be a *Cardinia*. NearSmoky Hill river, in division 10.

Bakevellia parva, Meek and Hayden. Trans. Albany Inst., vol. iv., March 2d, 1858. This is probably the same species referred by Prof. Swallow to *Avicula antiqua*, Munster,—*Bakevellia antiqua* of King, and others. In describing this species, we spoke of its very near relation to *B. antiqua*, but pointed out some characters in which it differs. At that time we had seen but a few imperfect specimens; since then, however, we have obtained many others, a careful examination of which causes us still to regard it as distinct from *B. antiqua*. Of a large number of individuals, we have never seen any one-half the size of the smallest, nor one-eighth the size of the largest figures of that species given by King, while the cardinal area is also proportionably much narrower in our shell. Division No. 10. On Smoky Hill river and cottonwood creek.

Area carbonaria, Cox. Vol. iii. Geol. Report, Ky., p. 567, pl. 8, fig. 5. Our fossil is smaller, and less distinctly striate, but exactly the form of the above. Near Leavenworth landing, coal measures.

Leda subscitula, Meek and Hayden. Trans. Albany Inst., vol. iv. March 2d, 1858. Division No. 10. Smoky Hill river and Cottonwood creek.

Pleurophorus? subcuneata, Meek and Hayden. Trans. Albany Inst., vol. iv., March 2d, 1858. Our specimens of this species being casts we are left in doubt in regard to its generic relations. We suspect it may be a *Cardinia*. Same locality and position as preceding.

Axinus (*Schizodus*) *ovatus*, Meek and Hayden. Proceed. Acad. Nat. Sci. Phila. Dec., 1858. This is very much like the Permian forms, *S. rotundatus* and *S. truncatus*, but we found it in a rock on Cottonwood creek which we regard as below the Permian.

Axinus rotundatus, Brown. Trans. Manch. Geol. Soc. vol. i. p. 31, pl. 6, fig. 29. We have refeired this little shell to the above species with some doubt, but we have seen no characters by which it can be distinguished. No. 10. Near Smoky Hill river.

Allorisma? Leavenworthensis, Meek and Hayden. Proc. Acad. Nat. Sci., Phila., Dec., 1858, p. 263. Upper coal measures, Leavenworth City.

Allorisma subcuneata, Meek and Hayden. Proceed. Acad. Nat. Sci. Phila. ec., 1858, p. 263. Locality and position same as last.

Allorisma? altirostrata, Meek and Hayden. Proceed. Acad. Nat. Sci., Phila Dec. 1858, p. 263. Upper coal measures, Grasshopper creek.

Allorismv? Cooperi, Meek and Hayden. Proceed. Acad. Nat. Sci., Phila. Dec., 1858, p. 264. (*Panopœa Cooperi*, Meek and Hayden. Trans. Albany Inst., vol. iv., March 2,1858.) Near Helena, in upper coal measures.

Leptodomus granosus, Shumard. Trans. Acad. Sci., St. Louis, vol. i. p. 207. Upper coal measures, near summit of hills, back of Leavenworth City; also near Leavenworth landing.

GASTEROPODA.

Pleurotomaria humerosa, Meek and Hayden. Proceed. Acad. Nat. Sci., Phila. Dec., 1858. In upper coal measures, at Grasshopper creek.

Pleurotomaria subturbinata, Meek and Hayden. Proceed. Acad. Nat. Sci., Phila. Dec., 1858, p. 264. Locality and position same as last. In the Proceedings of the Academy above cited, the locality of this species is *erroneously* given as at Helena.

Bellerophon ——? We found a small undetermined species of this genus in division 10. On Smoky Hill river and near Cottonwood creek; also casts of a large species at Leavenworth landing and Grasshopper creek, in the upper coal measures.

Euomphalus ——? The species here alluded to, was found in No. 11 and 37 of the foregoing general section. Either it or a very closely allied species, also ranges far below this, in the upper coal measures. It is nearly related to, if not identical with a species Prof. Hall has described in the Iowa Report, under the name of *E. rugosus*.

CEPHALAPODA.

Nautilus eccentricus, Meek and Hayden. Trans. Albany Inst., vol. iv., March 2d, 1858. Smoky Hill river, division No. 10.

FISHES.

Xystracanthus arcuatus, Leidy. Upper carboniferous rocks at Leavenworth landing.

Cladodus occidentalis, Leidy. Division No. 37 of foregoing general section. At Manhattan.

Petalodus Alleghaniensis, Leidy. Jour. Acad. Nat. Sci. vol. iii. p. 161. Division No. 10, of foregoing general section. Fort Riley.

Catalogue of Birds collected on the Rivers Camma and Ogobai, Western Africa, by Mr. P. B. Duchaillu in 1858, with notes and descriptions of new species.

BY JOHN CASSIN.

The collection made by Mr. Duchaillu on the River Camma or Fernando Vaz and its tributaries, the Ogobai, Rembo, and Ovenga rivers, is the most extensive and interesting yet made by him, or ever yet received from Western Africa, in the Museum of this Academy. The two last names of rivers I have not used in the localities given in the succeeding catalogue, mainly because I have not succeeded in finding them in any geographical work to which I have access, but now state that these names occur in Mr. Duchaillu's letters, and that they appear to be tributaries to the River Camma. Much valuable information will undoubtedly be added to the geography of this part of Western Africa by Mr. Duchaillu.

As in former collections, Mr. Duchaillu has not sent birds of which numerous specimens had already been sent in former collections. This fact will account for the absence of the names of some well known species from the present catalogue.

1. GYPOHIERAX ANGOLENSIS, (Gmelin.)
   Falco angolensis, Gm. Syst. Nat. i. p. 252 (1788.)
   Polyborus hypoleucus, Bennett.
   Gray's Genera, i. pl. 4. Jard. and Selby, Ill. N. S., pl. 13.
   From the Camma and Ogobai. Young, with plumage entirely dull ashy brown, the head only becoming spotted with white. This is the only vulture received from Mr. Duchaillu, and has come in all his collections.

2. POLYBOROIDES TYPICUS, Smith.
   Polyboroides typicus, A. Smith, Ill. Zool. S. Afr. Birds.
   "Polyboroides radiatus, (Scopoli,)" Auct.
   Smith, Ill. S. Afr. Birds, pl. 81, 82.

Otto Kochler del.

Lith.et col Bowen & Co Philada.

1. MELIONOTHES EXILIS. CASSIN.

2. HETAERODES INSIGNIS. CASSIN.

Otto Koehler del. Lith.et col.Bowen & Co Philad.

Adults in fine plumage, from the Camma,—the same species as formerly received in Mr. Duchaillu's collection from the River Muni, and identical with South African specimens. The species from Madagascar, which is *Polyboroides radiatus*, (Scopoli,) and the same as *Falco gymnogenys*, Temm., is smaller and lighter colored, and has the transverse stripes on the abdomen much less numerous and wider apart than in the present bird.

3. HALIAETUS VOCIFER, (Daudin.)
Falco vocifer, Daud. Traite d'Orn, ii. p. 65.
Le Vaill., Ois. d'Afr., i. pl. 4.
From the Camma. Identical with South African specimens.

4. HALIAETUS BLAGRUS, (Daudin.)
Falco blagrus, Daud. Traite d'Orn, ii. p. 70.
Le Vaill., Ois. d'Afr. pl. 5.
The synonymes given by authors for this species are rather extended, and I suspect not entirely correct; in fact, perhaps, making a heavy draft on probability. At present I regard *F. blagrus* as a distinct and well characterized species. From the Ogobai, and identical with others from South Africa.

5. SPIZAETUS CORONATUS, (Linnæus.)
Falco coronatus, Linn. Syst. Nat., i. p. 124 (1766.)
Falco albescens, Daud. Traite d'Orn. ii. p. 45.
Edwards' Birds, v. pl. 224. Le Vaill Ois. d'Afr., i. pl. 3. Smith, Ill. S. Afr. Birds, pl. 40, 41. Identical with specimens in the Acad. Mus., from South Africa, and in adult plumage. From the Ogabai river.

6. SPIZAETUS OCCIPITALIS, (Daudin.)
Falco occipitalis, Daud. Traite d'Orn., ii. p. 40.
Le Vail, Ois. d'Afr. i. pl. 2.
From the Ogabai river. Adults in black plumage.

7. SPILORNIS BACHA, (Daudin.)
Falco bacha, Daudin.
Falco albidus, Cuvier.
Circaetus melanotis, Verreaux in Hartl. Orn. W. Afr. p. 7?
Le Vaill, Ois. d'Afr., i. pl. 15. Temm. Pl. Col., i. pl. 19.
The present specimen is in very light colored plumage, undoubtedly young, and much as described and figured by Cuvier and Temminck, as above cited. It is, however, quite identical with the *bacha* of Southern Africa, of which a very complete series of specimens is in the Academy's Museum. The young is nearly white, though even when fully grown and in a more advanced plumage has the head white, and a large spot of black in the region of the eye and ear. In the last plumage I suspect this bird is the species recently described by our friend, Mr. Verreaux, of Paris, as cited above.
Young ♂. Upper parts white, tinged with yellow, every feather with a subterminal spot of dark brown; lanceolate and ovate on the head and neck; larger and more circular on the back; every feather narrowly tipped with white. Under parts white, with a few spear-heads of brownish black on the breast and sides. Quills and superior wing coverts dark brown; all the quills and every feather of the coverts tipped with white; tail ashy brown, with about six transverse bands of black, and tipped with white. Total length 23 inches; wing 12; tail 10 inches.
Hab.—Ogobai river, a branch of the Camma river, Western Africa.

8. ACCIPITER TOUSSENELLI, (Verreaux.)
Nisus Toussenelli, Verr. Cab. Jour. iii. p. 101.
Very fine specimens of this handsome Hawk, are now for the first time sent by Mr. Duchaillu. From the Ogobai.

9. ACCIPITER HARTLAUBII, (Verreaux.)
Nisus Hartlaubii, J. Verr. in Hartl. Orn. West Af. p. 15.

Apparently the bird described by that accurate and reliable naturalist Mr. Verreaux, and happily named in honor of the most accomplished living ornithologist of Europe. From the Ogobai.

10. MICRASTUR MACROURUS, (Hartlaub.)
"Astur macrourus, Temm." Hartl. Cab. Jour. 1855, p. 353.

One of the most beautiful of the Falconidæ, and having for its nearest relatives the American birds forming the genus *Micrastur*, G. R. Gray, and especially the larger *M. brachypterus*, (Temminck.) The present specimen is in mature plumage, but is probably a different sex from that described as above, and has the entire under parts of the body dark rufous chestnut. In the description by Dr. Hartlaub, the under parts are given as white, but the difference of the two specimens in color is not greater than, and in fact is similar in some degree to, that of the male and female of *Micrastur brachypterus*.

Adult ♀. Upper parts dark bluish brown; upper tail coverts white; under parts dark reddish chestnut; under wing coverts chestnut; under tail coverts white. Quills ashy brown, white beneath and with transverse bands of black; tail black, tipped with white and with about four irregular narrow bands of white. Throat light cinereous; feathers of the occiput and neck behind white at base. Bill short, strong, rather abruptly curved, cere large; nostrils circular; wings short, rounded, fifth quill longest; tail very long, graduated; feet moderate. Total length about 25 inches, wing 11, tail 15, tarsus 3 inches. From the Ogobai river.

11. AVICEDA CUCULOIDES, Swainson.
Aviceda cuculoides, Sw. B. of W. Afr. i. p. 104, (1837.)
Falco frontalis, Daudin?
Sw. B. of W. Afr. i. pl. 1.

A single specimen in mature plumage from the Camma. If this bird is *Falco frontalis*, Daudin, as stated by the Prince Bonaparte in Conspectus Avium, p. 20, the description and figure of Le Vaillant are amongst the most astonishing aberrations of ornithologists, which is saying much!

12. SCOTOPELIA PELII, (Kaup.)
Ketupa Peli, Kaup. Jard. Cont. 1852, p. 117.
Scotopelia typica, Bonap.

A singular species with naked *tarsi* and nearly related to the genus *Ketupa*. It is well described by Dr. Hartlaub in Cabanis' Journal, 1855, p. 358. From the Camma river.

13. BUBO LEUCOSTICTUS, Hartlaub.
"Bubo leucostictus, Temm." Hartl. Cab. Jour. iii. p. 354.

From the Camma river.

14. SYRNIUM WOODFORDII, (Smith).
Athene Woodfordii, Smith Zool. S. Afr.
Smith, Ill. S. Afr. Aves, pl. 71.

Adults and young of this species from the Camma.

15. CAPRIMULGUS FOSSII, J. Verreaux.
Caprimulgus Fossii, J. Verreaux, in Hartl. Orn. W. Afr., p. 23 (1857.)

This is the only species received from Mr. Duchaillu, and is given erroneously as *C. binotatus* in my catalogue of birds from the river Muni. In adult plumage this species is easily recognized by the white tips of the larger external coverts of the wings, and in nearly all the specimens that I have seen this character can be traced.

Specimens from Borneo and Sumatra in the Acad. Mus. which were received from the Leyden Museum, appear to be the *C. binotatus* of Bonaparte's Conspectus, (i. p. 60) but came labelled "*C. bisignatus* Boie," and seem to be the same as *C. affinis*, Horsfield. It is probable that the present species is *C. concretus*, Bonap. Consp. as just cited. From the Camma and formerly received from the Muni river.

[Jan

16. CYPSELUS AMBROSIACUS, (Gmelin.)
Hirundo ambrosiaca, Gm. Syst. Nat. ii. p. 1051.
Cypselus parvus, Licht. Verz. p. 58.
Temm. Pl. col. 460, fig. 2.
All the specimens that I have ever seen from Western Africa are darker colored than others from Eastern Africa and Madagascar in the Acad. Mus. In other respects they are very similar, and I cannot distinguish them specifically. From the Camma and Ogobai rivers.

17. CHAETURA SABINEI, (Gray.)
Acanthylis Sabinei, Gray in Griff. Cuv. ii. p. 70.
Chætura bicolor, Gray, Zool. Misc. p. 6.
Pallene leucopygia, Boie, Isis, 1844, p. 168.
From the Camma.

18. ATTICORA MELBINA, Verreaux.
Atticora melbina, J. & E. Verreaux, Mag. et Rev. Zool. 1851, p. 310.
From the Camma and formerly received from Cape Lopez.

19. ATTICORA NITENS, Cassin.
Atticora nitens, Cassin, Proc. Acad. Philada. 1857, p. 38.
Several specimens show no other characters than as above described. From the Ogobai.

20. HIRUNDO CAHIRICA, Lichtenstein.
Hirundo cahirica, Licht. Verz. p. 58.
Hirundo Boissoneauii, Temm.
A single specimen from the Camma river. Very light colored on the under parts of the body but apparently this species.

21. HIRUNDO NIGRITA, G. R. Gray.
Hirundo nigrita, Gray, Genera of Birds i. p. 58, (1845.)
Gray, Gen. i. pl. 20.
This fine species seems to indicate a distinct subgeneric group, having the bill and general form of typical *Hirundo* with a shorter tail. Its color too, pure black with the throat white, are quite characteristic. It does not appear to be a common species, a few specimens only having been received from the Camma.
In this species the white spot on the throat is much larger in the adult than is represented in Mr. Gray's plate above cited, inner webs of tail feathers white, except at the ends, all other parts lustrous metallic purplish black.

22. CECROPIS GORDONI, (Jardine.)
Hirundo Gordoni, Jard. Contr. Orn. 1851 p. 141.
This is a quite distinct and well characterized species of the same group as the large *C. senegalensis*. Received for the first time in the collection from the Ogobai river.

23. EURYSTOMUS AFER, (Latham.)
Coracias afra, Lath.
Eurystomus purpurascens et rubescens, Vieill.
Colaris viridis, Wagler, Syst. Av.
Le Vaill. Ois. Par., pl. 35.
From the Ogobai. Rather smaller than specimens from Sierra Leone.

24. EURYSTOMUS GULARIS, Vieillot.
Eurystomus gularis, Vieill. Nouv. Dict.
Le Vaill. Ois. Par., pl. 36.
From the Ogobai.

25. HALCYON SENEGALENSIS, (Linnæus.)
Alcedo senegalensis, Linn. Syst. Nat. i. p. 180 (1766.)
Buff. Pl. Enl. 594. Swains. Zool. Ill., pl. 27.
From the Camma.

26. HALCYON DRYAS, Hartlaub.
Halcyon Dryas, Hartl. Cab. Jour. 1854, p. 2.
Von Muller, Beitr. Orn. Afr., pl. 11.
Perhaps the most handsome species of Kingfisher of Western Africa, and of the same group as *H. cinereifrons*. From the Camma river.

27. HALCYON BADIA, Verreaux.
Halcyon badia, J. & E. Verreaux, Rev. et Mag. Zool. 1851, p. 264.
From the Ogobai.

28. ALCEDO QUADRIBRACHYS, Bonaparte.
"Alcedo quadribrachys, Temm." Bonap. Consp. Av. i. p. 158.
Jard. Contr. Orn., 1851, pl. 79.
From the Camma.

29. CORYTHORNIS CÆRULEOCEPHALA, (Gmelin.)
Alcedo cæruleocephala, Gm. Syst. Nat. i. p. 449 (1788.)
Quite identical with specimens from Southern Africa. From the Camma.

30. CERYLE RUDIS, (Linnæus.)
Alcedo rudis, Linn. Syst. Nat. i. p. 181.
Ispida bicincta, Swains. B. of W. Afr. ii. p. 95.
From the Camma and Ogobai.

31. MEROPS VARIEGATUS, Vieillot.
Merops variegatus, Vieill. Ency. Meth. p. 390.
Merops cyanipectus, Verr. Rev. et Mag. Zool. 1851, p. 269.
Le Vaill. Guep., pl. 7.
Evidently an abundant species on the Camma and Ogobai rivers.

32. MEROPS ALBICOLLIS, Vieillot.
Merops albicollis, Vieill.
Merops Cuvieri, Licht. Verz. p. 13.
Le Vaill. Guep., pl. 9.
Rarely received in Mr. Duchaillu's collections, and seems to be more numerous further north. From the Ogobai.

33. MEROPS BICOLOR, Daudin.
Merops bicolor, Daud., Ann. du Mus., ii. p. 440, pl. 62, fig. 1.
Merops malimbus, Shaw, Nat. Misc. xvii. pl. 701.
Vieill. Gal. i. pl. 186. Le Vaill. Guep., pl. 5,
Frequently received in Mr. Duchaillu's collections. From the Camma and Rembo rivers.

34. MEROPOGON BREWERI, nobis.
Large, bill compressed, curved, wings rather short, fourth quill longest, first quill short, tail rather long, the two in the middle much the longest and attenuated at the end, others truncate or emarginate at the tips, all the secondary quills emarginate at the tips, feathers of the throat and neck in front somewhat lengthened. Total length about 13½ inches, wing 4¾, tail 7½, bill from corner of mouth direct to tip of upper mandible 2 inches, middle tail feathers 7½, outer 4½ inches.

Head glossy black, back, wings and middle tail feathers green, under parts fine reddish fulvous with a tinge of green, a transverse band of chestnut on the breast immediately below the long black feathers of the neck. Quills green, inner edges of primaries black, of secondaries rufous, tail feathers (except two in the middle) fine dark chestnut, and tipped with green. Bill black, feet light colored.

Hab.—Ogobai river, a branch of the Camma river, Western Africa. Discovered by Mr. P. B. Duchaillu.

This very handsome bird seems to belong to the genus *Meropogon*, Bonap. Consp. Av. i. p. 164, being in fact a large *Mellitophagus*, with the feathers of the throat and neck lengthened, though not so distinctly as in *Nyctiornis*. It

is easily distinguished from all other species by its colors, and especially by its black head, which color terminates abruptly on the breast and is succeeded by a band of dark chestnut. It is nearly as large as *Nyctiornis amictus* or *Athertoni*.

It is with great gratification that I dedicate this fine bird to my valued and constant friend Thomas M. Brewer, M. D., of the city of Boston, one of the most distinguished of American ornithologists.

35. MEROPISCUS GULARIS, (Shaw.)

Merops gularis, Shaw, Nat. Misc. ix. pl. 337 (1798.)

Gray, Gen. i. pl. 30.

Apparently of frequent occurrence in the country on the Camma and Ogobai. The adult of this species is very handsomely figured by Mr. Gray as above, but the young bird is quite different, and might readily be mistaken for a distinct species. Young ♂. Entire upper parts, throat and breast dark green, on the throat mixed with a few red feathers, rump light blue, abdomen and under tail coverts blue; quills black with a spot of chestnut at the base of the secondaries, tail black, bill black, shorter than in adult.

36. APALODERMA NARINA, (Vieillot.)

Trogon narina, Vieill.

Gould, Monog., pl. 26.

From the Camma river, and formerly received from the river Muni. Young ♂. Upper parts like the adult, but with the throat and breast light ashy, a few feathers only green at the end, abdomen pale rose-red, upper mandible dark brown, under mandible yellow.

37. NECTARINIA FULIGINOSA, (Shaw.)

Certhia fuliginosa, Shaw, Gen. Zool. viii. p. 223.

Vieill. Ois. dor., pl. 20, Nat. Lib. Sunbirds, pl. 14.

From the Camma, and formerly received from the Moondah river. The very peculiar color given as "fuliginous" by authors, assumes a variety of shades in this species, apparently depending on age and season. It is frequently very pale, giving the entire bird a dull brownish yellow or ochre color, and the metallic violet of the rump is frequently wanting.

38. NECTARINIA ANGOLENSIS, (Lesson.)

Cinnyris angolensis, Lesson, Traite d'Orn. i. p. 295.

Nectarinia Stangeri, Jardine, Ann. Nat. Hist. x. p. 187, pl. 13.

Jard. and Selb. Ill. Orn., N. S., pl. 48.

From the Muni, Moondah and Camma rivers, and evidently of frequent occurrence in this region of Western Africa. Young ♂. Upper parts dull dark brown, a few metallic violet feathers in front, throat lustrous metallic green, succeeded by a band of violet and scarlet on the breast. Abdomen dull yellowish with longitudinal and irregular stripes of brownish black, wings and tail dark brown.

39. NECTARINIA CHLOROPYGIA, Jardine.

Nectarinia chloropygia, Jard. Ann. Nat. Hist. x. p. 188, pl. 14.

Cinnyris chalybea, Swains. B. of W. Africa, ii. p. 132.

Jard. and Selb., Ill. N. S., pl. 50, Swains. Zool. Ill., pl. 95.

Apparently one of the most abundant species of Equatorial Africa, and received in all Mr. Duchaillu's collections. Young ♂. Upper parts yellowish green, a few feathers tipped and edged with metallic golden green, under parts yellow, mixed with dark green on the throat, and scarlet on the breast.

From the Moonda, Muni, and Camma rivers.

40. NECTARINIA CUPREA, (Shaw.)

Certhia cuprea, Shaw. Gen. Zool. viii. p. 201, (1811.)

Cinnyris erythronotus, Swains. B. of W. Africa, ii. p. 30, pl. 15.

Vieill. Ois. Dor., pl. 23, 27.

Evidently not very common in the countries traversed by Mr. Duchaillu. Adult ♀. Upper parts olive, tinged with yellow on the rump, under parts greenish yellow, darker on the throat and breast, the yellow more clear on the abdomen.

From the Camma.

41. NECTARINIA CYANOCEPHALA, (Vieillot.)

Certhia cyanocephala, Vieill.

Cinnyris chloronota, Swains. B. of W. Africa, ii. p. 136, pl. 16.

Nectarinia obscura, Jard. Nat. Lib. Birds, xiii. p 253, (1842.)

Vieill. Ois. Dor., pl. 7.

This appears to be an abundant species in Equatorial Africa on the Atlantic, and seems to have a wide diffusion. Young ♂. Like the female, but with the under parts more strongly tinged with yellow, and with the top of the head dark brown. In this species the young birds have the under mandible white at base, and frequently for half or two-thirds of its length, which is not the case in the allied species immediately succeeding (*N. cyanolæma*). From the Camma and Ogobai, and formerly received from the Moonda and Muni rivers.

42. NECTARINIA CYANOLAEMA, Jardine.

Nectarinia cyanolaema, Jard., Contr. Orn. 1851, p. 154.

Young ♂. Upper parts dark olive, tinged with yellow, under parts pale yellowish green, with obscure spots of dark green, nearly black on the throat. Bill always black. From the Camma, and formerly received from the Moonda river.

43. NECTARINIA REICHENBACHII, Hartlaub.

Nectarinia Reichenbachii, Hartl. Orn. W. Africa, p. 50.

Several specimens from the Camma appear to be this species, though rather larger than as given by Dr. Hartlaub, as above. Young ♂. Like the female, but with the throat, abdomen and under tail coverts yellow, the former with a few lustrous metallic green feathers.

44. NECTARINIA TEPHROLAEMA, Jardine.

Nectarinia tephrolaema, Jard., Contr. Orn., 1851, p. 154.

From the Ogobai and Moonda rivers. The description of the female given by Dr. Hartlaub applies to young males in the present collection, but unfortunately I am not fully assured of the correctness of the supposed females of this species in this collection, and do not therefore describe with confidence. The specimens alluded to are entirely dark ashy, (about the color of the throat in the male,) darker above and lighter on the under parts.

This appears to be a rare species in Equatorial Africa, and is remarkable in having the throat pale cinereous, though surrounded with a large space of brilliant metallic green. It is probably the type of a subgenus and does not belong to the same group as the preceding (*N. cyanolaema*,) though given so, erroneously, by Dr. Reichenbach in his genus *Anthodiæta*. This author is, however, not acquainted with the genera of birds.

45. NECTARINIA SUBCOLLARIS, Reichenbach.

Nectarinia subcollaris, Reich.

N. metallicus, Licht.?

N. collaris, (Vieill.) ?

Specimens in the collection are evidently the species intended by the name here adopted; but with numerous specimens before me purporting from European labels to be *N. collaris* and *N. metallicus* I am under the necessity of entertaining a suspicion that all are identical. These specimens are perhaps not correctly labelled, but at present my leisure does not warrant an extended examination. These species are assuredly very nearly related. From the Camma.

46. NECTARINIA VERTICALIS, (Reichenbach.)

Leucochloridia verticalis, Reich.

"Nectarinia Vieilloti, Verreaux." Label of spec. in Acad. Mus.

Vieill. Ois. Dor., pl. 25.

An obscure species, of which two specimens only are in the collection from Mr. Duchaillu, one in the present collection and another formerly from the Moonda. In the Acad. Mus. are several specimens from the Rivoli collection, all of which are labelled "*Cinnyris cyanocephala*, ♀." It may be that species in immature plumage, or in the plumage of the rainy season.*

47. ANTHREPTES FRASERI, Jardine and Selby.
Anthreptes Fraseri, Jard. and Selb., Ill. Orn. N. S. pl. 52, (1843.)

Several specimens of this species are in the present collection from the Camma and Ogobai. The adult is well represented and described in the work cited above, though in the figure the tail is quite erroneous. The middle feathers of the latter are greenish yellow, which is also the color of the outer webs, and a large portion of the inner webs of all the other feathers of the tail. ♀ Smaller than the male but very similar in colors. Young ♂. Like the female, but with the colors duller and of darker green in all the plumage, no axillary tufts.

48. ANTHREPTES AURANTIA, Verreaux.
Anthreptes aurantia, Verr. Rev. et Mag. Zool. 1851, p. 417.
The adult male is described by our valued friend as above cited, and the type of his description is now in the Museum of this Academy. The female is so entirely different that it might readily be regarded as a distinct species. Adult ♀. Upper parts lustrous metallic dark green, purple on the rump and tail, throat and breast pale ashy, abdomen pale yellow. A stripe of white through and behind the eye. Young ♂. Upper parts dull yellowish green, under parts pale yellow, tinged with very pale ashy on the throat, very distinct stripe of pale yellowish white through the eye, tail metallic green, outer feathers tipped with dull white. From the Camma and Ogobai.

49. DRYMOICA RUFICEPS, (Rüppell.)
Malurus ruficeps, Rüpp. Zool. Atlas, p. 54, (1826.)
Rüpp. Zool. Atlas, pl. 36, fig. 1.
Several specimens from the Camma and Ogobai seem to be this species, but are rather larger than South African specimens in the Acad. Mus.

50. DRYMOICA NÆVIA, Hartlaub.
Drymoica nævia, Hartl. Orn. W. Afr. p. 56.
A single specimen from the Camma and another in a former collection from Cape Lopez, appear to be this species, though not in adult plumage. Related to the preceding, but larger and with the bill much stronger; and also related to the succeeding.

51. DRYMOICA FORTIROSTRIS, Jardine.
Drymoica fortirostris, Jard. Contr. Orn. 1852, p. 60.
Drymoica robusta, Rüppell, Syst. Uebers. p. 35, pl. 13?
From the Camma and formerly received from Cape Lopez. In a young bird the bill is pale yellow, except the tip of the upper mandible. The birds regarded by me as the present species and the preceding (*D. nævia*) are both nearly related to *D. robusta*, Rüppell, Syst. Ueb. pl. 13.

52. DRYMOICA LATERALIS, Fraser.
Drymoica lateralis, Fras. Proc. Zool. Soc. London, 1843, p. 16.
Numerous specimens from the Camma, Moonda and Muni rivers appear to be this species, though utterly impossible to determine satisfactorily from the published descriptions. It seems to be the most abundant species of this genus in Equatorial Western Africa.

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*Two other species complete the *Nectariniæ*, found by Mr. Duchaillu:
1. Nectarinia superba, (Vieillot), from the river Muni.
2. Nectarinia Johannæ, Verreaux, from the river Moonda.

Genus EUPRINODES, nobis.

Size small, bill rather long, slightly curved, nostril large, wings short, first quill spurious, fourth and fifth longest and nearly equal, tail rather long, graduated, legs moderate, slender. More nearly related to *Prinia*, (*P. familiaris*) than to either of the preceding species of *Drymoica*.

53. EUPRINODES RUFOGULARIS, (Fraser.)

Drymoica rufogularis, Frazer, Proc. Zool. Soc. London, 1843, p. 17.
Fraser, Zool. Typ. pl. 42, fig. 1.

A very pretty and well marked little bird now for the first time received from the Camma. Mr. Fraser's figure seems to represent a bird not mature, but the species is easily recognized by its rufous throat and white tail feathers.

54. EUPRINODES OLIVACEUS, (Strickland.)

Prinia olivacea, Strickl. Proc. Zool. Soc. London, 1844, p. 99.

The species to which I apply this name is labelled by Mr. Duchaillu as distinct, but no one of several specimens is mature, though agreeing precisely with the description cited above. I am not without a suspicion that this bird is the young of the preceding. From the Camma.

55. EUPRINODES SCHISTACEUS, nobis.

Strictly congeneric with the two preceding. Head, breast and entire upper parts bluish cinereous, with a slight tinge of olive on the back; abdomen, under wing coverts and under tail coverts, white. Quills brownish black, four middle tail feathers brownish black, with obscure tranverse narrow stripes of a darker shade of the same color, four external tail feathers on each side, pure white, bill black, legs light colored. Total length about 4¼ inches, wing 1⅞, tail 2 inches.

Hab.—River Camma, Western Africa. Discovered by Mr. P. B. Duchaillu.

The preceding three species are very similar in their general organization, and form a very natural group. All have the outer tail feathers white. The present species is easily recognized by the entire head and upper breast being bluish ashy, which color is abruptly succeeded by white on the lower part of the breast. One specimen only, labelled as an adult male, is in the collection from the Camma.

56. CAMAROPTERA TINCTA, (Cassin.)

Syncopta tincta, Cassin, Proc. Acad. Philada. vii. p. 325, (1855.)

The adult is described by me as above. In the present collection are specimens that we regard as the young, and so different from the adult that for the first time we perceive this to be rather a difficult species. Young.—Upper parts yellowish olive green, under parts cinereous, mixed with yellow on the breast and sides, tibiæ greenish ochre yellow, under wing coverts and edge of wing at shoulder, dull yellow. Younger.—Entire plumage yellowish olive green, paler on the under parts and nearly white on the abdomen, tibiæ brownish ochre yellow, edge of wing and under coverts yellow. The last plumage much resembles that of *C. concolor*, Hartlaub.

From the Camma and formerly from the Muni and Cape Lopez.

57. CAMAROPTERA SUPERCILIARIS, (Fraser.)

Sylvicola superciliaris, Fraser, Ann. and Mag. Nat. Hist. xii. p. 440, 1843.
Prinia icterica, Strickland, Proc. Zool. Soc. London, 1844, p. 100.

Evidently the bird described by both of the authors here cited, but only ascertained to belong to this genus on inspection of the original specimen by Dr. Hartlaub. (Ann. and Mag. Nat. Hist., 1858, p. 470). A single specimen from the Camma.

58. CAMAROPTERA CANICEPS, nobis.

About the size of *C. tincta*, but rather smaller than *C. superciliaris*, and strictly congeneric with both species. Head above and cheeks light cinereous, other upper parts yellowish olive. Breast with a wide transverse band of

yellow, throat and abdomen white. Quills brownish black, edged externally with olive, tail dark olive, with an obscure subterminal band of brownish black, and outer feathers narrowly tipped with white. Under wing coverts, under tail coverts and *tibiæ* ashy white. Bill bluish black, legs light colored. Total length about 4½ inches, wing 2, tail 1¾ inches.

Hab.—Camma River, Western Africa. Discovered by Mr. P. B. Duchaillu.

This handsome and rather singular species may be easily recognized by its yellow breast, which color assumes the form of a wide transverse band and contrasts strongly with the white color of the throat and abdomen. One specimen only which is a male adult is in the collection from the Camma.

59. CAMAROPTERA BADICEPS, (Fraser.)

Sylvia badiceps, Fraser, Proc. Zool. Soc., London, 1842, p. 144.

The form and general characters of this bird are more those of the genus *Camaroptera* than of *Drymoica*, but it is very probably the type of a distinct generic or subgeneric group. It is a strongly marked species. From the Camma and formerly from the Moonda and Cape Lopez.

60. STIPHRORNIS ERYTHROTHORAX, Hartlaub.

"Stiphrornis erythrothorax, Temm." Hartl. Cab. Jour. iii. p. 355 (1855.)

Three specimens only of this beautiful bird are in the collection from the Camma, and are labelled as males. The adult is described by Dr. Hartlaub as above. Young ♂. Upper parts, including head, dull olive, cheeks ashy spot in front of the eye, white. Throat and breast dull yellowish, every feather edged with ashy black, abdomen white.

61. PRATINCOLA SALAX, Verreaux.

Pratincola salax, J. & E. Verreaux, Rev. et Mag. Zool. 1851, p. 307.

From the Camma and formerly received in Mr. Duchaillu's collections from Cape Lopez.

62. SYLVIETTA VIRENS, nobis.

"Sylvietta microura, Rüppell," Cassin, Cat. B. from Cape Lopez. Proc. Acad. Philada., 1856, p. 318.

Small, tail very short, legs long, slender, feathers of the back and rump long. Head above dark greenish brown, back, wings and tail olive green. Line over the eye, throat and breast light rufous, abdomen white tinged with yellow in the middle, flanks ashy, tibiæ dark yellowish green (ashy brown in young birds) under wing coverts yellow, quills light brown edged externally with greenish yellow. Bill light brown, under mandible nearly white, legs light colored. Total length from tip of bill to end of tail about 3 inches, wing 1¾, tail ¾, tarsus ¾ inches. Sexes alike, female rather smaller.

Hab.—Camma river and Cape Lopez, Western Africa. Discovered by Mr. P. B. Duchaillu.

Having now several specimens, adult and young, and of both sexes of this curious little bird, and various "Crombecs" also from Africa,* I cannot jus-

*The two species of *Sylvietta* in the Acad. Mus. seem to be as follows:

1. SYLVIETTA RUFESCENS, (Vieillot.)

Dioœum rufescens, Vieill. Nouv. Dict. ix., p. 407 (1817.)

Sylvietta crombec, Lafresnaye, Rev. Zool. 1839, p. 258.

Le Vaill. Ois. d'Afr. iii. pl. 135.

Specimens from various localities in Southern Africa, also from "Elephant's Bay, Western Africa." The latter were collected and presented by A. A. Henderson, M. D., Surgeon U. S. Navy.

2. SYLVIETTA BRACHYURA, Lafresnaye.

Sylvietta brachyura, Lafr. Rev. Zool. 1839, p. 258.

"Sylvietta brevicauda, De La Fresnaye." Name on plate in Lefebvre's Voy. Abyssinia.

Troglodytes microurus, Rüppell, Neue Wirbelth. Abyss. Voeg. p. 109?

Lefebvre, Voy. Abyss. Ois. pl. 6. Rüpp. Neue. Wirbelth. Voeg., pl. 41, fig. 1?

Much smaller than the preceding and more uniformly colored on the under

tify my former conclusion that the species is identical with Rüppell's *Troglodytes micrurus*, Neue Wirb. Abyss. pl. 41, fig. 2. The upper parts of the body are constantly clear yellowish olive, with the head above dark brown, throat and breast only rufous, abdomen white with a yellow tinge in the middle. It is clearly not the bird figured in Lefebvre's Abyssinia Ois., pl. 6, which is in the Acad. Coll. labelled "Senegal." The present bird has the bill shorter and less curved, and the wings and even the tail shorter than in either of the species of *Sylvietta* now before me. It may, indeed, indicate a distinct generic or subgeneric group.

Genus HYLIA, nobis.

Small, in general appearance sylviform. Bill curved, upper mandible thick or wide on the lateral view, compressed towards the end, carinated, nostril in a large membrane. Wing moderate, first quill spurious, third and fourth longest and nearly equal, tail rather long, legs moderate, tarsus with about four large scales in front, toes slender, claws rather large. Type *Sylvia prasina*, Cassin.

63. HYLIA PRASINA, (Cassin.)

Sylvia prasina, Cassin, Proc. Acad. Philada. 1845, p. 325.

"Stiphrornis superciliaris, Temm. Mus. Lugd." ?

This bird is by no manner of means a *Stiphrornis*, if *S. erythrothorax* is the type, which appears to be the case, nor is it a *Chloropeta* of which *C. natalensis*, Smith, is the type, nor moreover do we know any other genus to which it belongs, and so set up for ourselves as best we may. Numerous specimens from the Camma and the Moonda.

64. PHYLLOPNEUSTE UMBROVIRENS, (Rüppell) ?

Sylvia (Ficedula) umbrovirens, Rüpp. Neue. Wirb., p. 112?

Two specimens in immature plumage, exceedingly like *S. sibillatrix* and *S. icterina* of the Acad. Coll. These specimens are much as described by Rüppell as above. From the Camma.

65. CISTICOLA CURSITANS, (Franklin.)

Prinia cursitans, Frankl. Proc. Zool. Soc. London, 1841, p. 118.

Sylvia cisticola, Temm. ?

Gould B. of Eur., pl. 113. ?

Several specimens now received from the Camma are scarcely different from the bird of Europe or that of Asia. Specimens from the Cape of Good Hope and from Northern Africa, strictly the same as the present specimens so far as I can see, are in the Acad. Coll. They rather more closely resemble Asiatic specimens, but are scarcely different specifically from those of Southern Europe.

Genus PARMOPTILA, nobis.

Allied to *Pardalotus*. Size small, bill thick, rather wide at base, depressed, curved. Wing moderate, first quill spurious, second and third longest, tail moderate, legs rather strong, toes moderate, claws strong. Feathers of the head and throat in the present species, scale-like.

66. PARMOPTILA WOODHOUSEI, nobis.

♂. Head and throat covered with rounded scale-like feathers, which are rufous, lighter on the throat, brighter and nearly brick-red on the forehead. Back, wings and tail light umber brown with a slight tinge of greenish on the back, quills brownish black edged internally with reddish white. Entire under parts (except the throat) white, thickly spotted with brownish black. Bill bluish black, legs yellowish white (in skin.)

♀. Upper parts including head, brown tinged with olive, under parts

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parts of the body. Possibly the birds represented in the two plates cited may not be identical. The species described by Lafresnaye as above, is labelled "Senegal."

lighter, nearly white on the abdomen, with obscure traces of the black spots of the male. No rufous on the head nor throat. Total length, ♂ about 4 inches, wing 2, tail 1½ inches. ♀ Total length, 3¾ inches.

Hab.—River Camma, Western Africa. Discovered by Mr. P. B. Duchaillu.

This is the only bird from Western Africa that I have ever seen which belongs to the *Pardalotinæ*. It is easily distinguished specifically by its rufous head and throat and spotted under parts, and is a very curious and handsome little bird.

This bird is named in honor of my friend Samuel W. Woodhouse, M. D., of this city, an accomplished and promising young naturalist and scientific traveller in the western countries of the United States.

67. ÆGITHALUS FLAVIFRONS, Cassin.

Ægithalus flavifrons, Cassin, Proc. Acad. Philada. 1855, p. 325.

Proc. Acad. Philada. 1858, pl. 1, fig. 2.

The male is described and figured by me as above. In the collection from the Camma are females which are very similar to the males but rather smaller and lighter colored. Both sexes have the forehead yellow.

68. MOTACILLA CAPENSIS, Linnæus.

Motacilla capensis, Linn. Syst. Nat. i. p. 333 (1766.)

Le Vaill. Ois. d'Afr., pl. 178. Kittl. Kupf., pl. 20, fig. 2.

The first appearance of this species in the fauna of Western Africa. Several specimens from the Ogobai are not to be distinguished from others in the Acad. Mus. from Southern Africa.

69. ANTHUS GOULDII, Fraser.

Anthus Gouldii, Fras. Proc. Zool. Soc. London, 1843, p. 27.

Numerous specimens, impossible to determine conclusively from the short and imperfect descriptions. From the Camma and formerly received in every collection from Mr. Duchaillu.

Genus MACROSPHENUS, nobis.

General aspect of *Orthotomus* (*O. sericeus*, Temm.) and *Ramphocænus* (*R. melanurus*, Vieill,) but with the bill stronger, wider laterally and more compressed, and with the legs and feet stronger. Bill long, rather strong, straight, wide at base, compressed towards the end, upper mandible carinated, curved and distinctly notched at the tip, nostril in a large membrane, under mandible rather thick, somewhat curved in its outline, ascending towards its tip. Wing moderate, first quill spurious, fourth, fifth and sixth longest and nearly equal, tail moderate or rather short, legs moderate, claws rather strong, curved.

This genus, which I propose for the species immediately succeeding, is exactly that of a bird in the Rivoli collection now in the Museum of this Academy, labelled "Ramphocene vert, *Ramphocenus viridis*, Madagascar." The handwriting of this label I am not acquainted with, but the same specimen bears another label of locality only: "Madagascar," which I suppose to be in the handwriting of Mons. Victor Massena, and having his initials appended. This bird may be *Ramphocænus viridis*, Lesson, Traite d'Orn, p. 377, but which is stated by M. Lesson to be a species of Brazil.*

* MACROSPHENUS VIRIDIS, (Lesson ?)

Ramphocænus viridis. Lesson, Traite d'Orn. i. p. 377, (1831) ?

Larger than the species above described. Bill long, strong, straight, a few pairs of slender bristles at the base of the upper mandible, wings and tail proportionately rather longer than in the above species. Entire upper parts olive green, darker on the head and tinged with yellow on the back. Throat, breast and middle of the abdomen yellow, sides, flanks, tibiæ and under tail coverts yellowish green, nearly the color of the back. Under wing coverts yellow, quills brownish black, secondaries edged internally with light reddish, tail dark olive green. An obscure stripe of yellowish in front of the eye. Bill light brown or horn color, legs light colored. Total length about 7 inches, wing 2¼, tail 3, bill, from gape, 1¼, tarsus 1 inch.

Hab.—Madagascar. (Rivoli collection label,) Spec. in Mus. Acad. Philada.

70 MACROSPHENUS FLAVICANS, nobis.

Bill long, straight, curved at the tip, and with a distinct notch. Head above dark greenish cinereous, throat and neck in front light cinereous. Body above light olive green, below greenish yellow inclining to saffron yellow on the flanks, tibia yellow, mixed with cinereous in its lower third. Under wing coverts silky white, quills brownish black, edged externally with ashy olive, tail olive green, darker on the inner webs. Bill bluish horn color, under mandible white at base, and viewed from below, having a longitudinal stripe of white throughout its length, legs light colored. Total length about 5 inches, wing 2¼, tail 1¾, bill from gape ⅞, tarsus ⅞ inches.

Hab.—Camma River, Western Africa. Discovered by Mr. P. B. Duchaillu.

The affinities of this bird, and that alluded to above, as probably from Madagascar, I have not satisfactorily determined. The general aspect is that of *Orthotomus* and *Ramphocœnus*, as stated above, but they appear also to be related to *Tatare*, Lesson, and in fact have the bills very similar to that of *Tatare luscinius* or *Thryothorus luscinius*, Quoy et Gaim. Voy. Astrolabe, Ois. pl. 5. At present my opinion is that they belong to the group *Troglodytinæ*.

Several specimens of this bird are in the collection from the Camma, all of which are labelled as males.

71. TURDUS PELIOS, Bonaparte.

Turdus pelios, Bonap. Consp. Av. i. p. 273, (1850.)

Though with numerous specimens before me, of both sexes and various ages, I rely on labelled specimens in the Acad. Mus. more than descriptions in the determining of this species. The specimens alluded to are labelled in the handwriting of that very competent naturalist, Mr. Jules Verreaux, and are quite identical with those in the present collection. This species is nearly related to *T. libonyanus*, Smith, of Southern Africa, and appears to be abundant on the Camma, Moonda and Muni rivers.

72. COSSYPHA POENSIS, Strickland.

Cossypha poensis, Strickl. Proc. Zool. Soc. London, 1844, p. 100.
Fraser, Zool. Typ. pl. 37.

Specimens from the Camma which seem to be the species described and figured as above, in adult plumage.

73. COSSYPHA VERTICALIS, Hartlaub.

Cossypha verticalis, Hartl. Beitr. Cab. Jour. 1855, p. 22.
Petrocincla albicapilla, Swains. B. of W. Afr. i. p. 284, pl. 32?

The only specimens that I have ever seen from Equatorial Africa are in the collection from the Camma, and are darker in the color of the upper parts of the body than specimens from Senegal in the Acad. coll. In fact I would describe the back and wing coverts in these specimens as black in the adult and brownish black in the young, though, in other respects, specimens from the localities mentioned are very similar.

74. GEOCICHLA COMPSONOTA, nobis.

About the size and general form of *Turdus interpres*, Temm. Pl. Col. 458, but does not resemble that species in colors. Tail short, wings moderate, first quill spurious, fourth and fifth longest, legs rather strong, toes rather long, bill straight, rather thick, upper mandible curved at the tip and distinctly notched. Head above, cheeks and small space on the chin dark cinereous, upper parts of body and wing coverts bright rufous, quills brownish black, the two first edged externally with dark cinereous, others and especially the shorter quills widely edged with the same bright rufous as the back, tail brownish black, outer feathers edged with rufous. Under parts (except a small space on the chin) white, tinged with dull yellowish brown on the breast and flanks. Bill bluish black, legs pale yellowish (in dried skin.) Total length about 6½ inches, wing 4¾, tail 2½, tarsus 1, bill from gape ⅞ inches.

Hab.—Camma river, Western Africa. Discovered by Mr. P. B. Duchaillu.

This bird is, so far as I can see, exactly the same genus as the Asiatic *T. interpres* alluded to above, and is about the same size. It is not a very good *Geocichla*, of which *T. citrinus* is the type, but not a remote relative. One specimen only in adult plumage is in the collection from the Camma.

Genus ALETHE, nobis.

General form and aspect of *Napothera*, but with the bill thicker, the bristles at the base of the upper mandible weaker and shorter, and in general characters more approaching *Cossypha* and *Geocichla*. Wing rather long, first quill short, fourth and fifth longest, tail moderate, legs rather strong.

75. ALETHE CASTANEA, (Cassin.)

Napothera castanea, Cassin, Proc. Acad. Philada. 1856, p. 158.

The adult is described by me as above from the river Moonda, and in the present collection are intermediate and young specimens, the latter entirely different from the adult, so much so indeed that were it not for more advanced or intermediate specimens it would scarcely be suspected of being the same species. They bear some resemblance to the young of *Petrocincla*.

Young ♂. Upper parts dark fuscous tinged with rufous on the rump and every feather having an oblong or ovate central spot of light yellowish rufous, wider on the back and wing coverts, narrower on the head. Under parts dull yellowish rufous, many feathers on the breast edged with black, wings and tail as in the adult.

Several specimens from the Camma and formerly from the Moonda.

76. ORIOLUS BARUFFII, Bonaparte.

Oriolus Baruffii, Bonap. Consp. Av. i. p. 347, (1850.)

"Oriolus intermedius, Temm." Hartl.

Several specimens in the collection from the Camma and formerly received from the Moonda.

77. ORIOLUS NIGRIPENNIS, Verreaux.

Oriolus nigripennis, Verr. Cab. Jour. 1855, p. 105.

Specimens from the Camma and formerly from the Moonda.

Genus TRICHOPHORUS, Temminck, Pl. Col. iii. (liv. 14, about 1821.)

Type *T. barbatus*, Temm. Pl. col. 88. Bill strong, curved, rather wide at base, nostril in a large cavity, aperture semicircular or crescent-shaped, rictal bristles strong. Wing moderate, rounded, first quill short, fifth and sixth quills longest, tail moderate, wide, legs short and rather slender, scales on tarsi confluent or obscure.

Belonging strictly to this group I have seen *T. gularis* (Horsfield) of Java, *T. sulphuratus* (Müller) of Borneo, *T. barbatus*, Temm., *T. olivaceus*, Swains. *T. flaviventris*, Smith, *T. calurus*, Cassin, and *T. simplex*, Hartlaub, of Africa, and several other Asiatic species. All these have the bill strong and curved, and several of them have the feathers of the head broad, somewhat lengthened and probably erectile. Hairs on the back of the neck frequently long and conspicuous.

78. TRICHOPHORUS CHLORONOTUS, nobis.

Strictly of the same group as *T. gularis*, Horsfield, and *T. calurus*, Cassin, and resembling both, but larger. Feathers of the head broad and lengthened, bristles on the back of the neck long and conspicuous, bill strong, curved, legs and feet rather small, feathers of the lower back and rump lengthened. Tail and upper coverts bright rufous, the outer feathers edged with greenish yellow. Head above dark cinereous or plumbeous, cheeks plumbeous, every feather with a medial line of white, back, rump and wings fine olive green, tinged with yellow on the rump, quills brownish black, edged externally with the olive green of the back, under wing coverts yellowish olive. Throat white, breast cinereous (or plumbeous, nearly the same as the head above); abdomen and under tail coverts greenish yellow. Bill bluish horn color, the edges of

both mandibles white, legs light brown (in dried skin). Total length about 8 to 8½ inches, wing 4¼, tail 3¾, tarsus ⅞, bill from gape 1⅛ inches.

Hab.—River Camma, Western Africa. Discovered by Mr. P. B. Duchaillu.

This large species is another of the red tailed birds like my *T. calurus*, and *T. gularis*, Horsfield, but differs entirely from those or any other that I have ever seen or found described. The feathers of the head are wide, much as in *T. barbatus*, and are lengthened, somewhat crest-like. The cinereous or plumbeous color of the breast varies in shade in different specimens, and assumes the form somewhat of a wide transverse band on the breast and upper part of the abdomen.

Several specimens are in the collection from the Camma. This is one of the largest and handsomest known species of this genus.

79. TRICHOPHORUS CALURUS, Cassin.

Trichophorus calurus, Cassin, Proc. Acad. Phila., viii. p. 158, (1856.)

Several specimens from the Camma do not differ from others formerly received from the Muni, though presenting some variations in size and the thickness of the bill. Female like the male in color, but with the feathers of the head shorter and more compact, rather smaller than the male, and with the bill weaker.

80. TRICHOPHORUS SIMPLEX, Hartlaub.

"Trichophorus simplex, Temm." Hartl. Cab. Jour. iii. p. 356.

Specimens from the Camma labelled as males are larger than as given by Dr. Hartlaub as above, and the throat is pure white. Total length about 8½ inches, wing 4⅛, tail 4 inches.

Though now first received from Mr. Duchaillu this species has been in the Acad. coll. for about twenty years, having been received in Dr. Mac Dowall's collection from St. Paul's river. I have regarded it as *Ixos inornatus*, Fraser, erroneously as it now appears from the statements of authors, but rather difficult to determine from the description of the latter. This bird does assuredly strongly approximate to typical *Ixos* both in form and color.

GENUS XENOCICHLA, Hartlaub, Orn. W. Afr. p. 86.

Type *X. syndactyla* (Swainson). Bill strong, straight, rather wide at base, compressed in its terminal half, type of upper mandible rather abruptly curved or hooked, gonys ascending, rictal bristles strong. Wing moderate, fifth and sixth quills longest, tail moderate or rather long, legs and feet moderate or rather slender, but larger than in *Trichophorus*, scales on thetarsi hardly observable. Outer toe united to the middle toe nearly or quite to the last joint.

The main distinction of this genus from the preceding is in the bill, which, instead of being wide and curved, is straight and compressed, and with the gonys strongly ascending to the tip, and the union of the outer and middle toe is also a strong character. This group is much more rapacious and shrike-like in its characters than the preceding. Belonging to this group I have seen *X. syndactyla* (Swainson), *X. canicapilla* (Hartlaub), *X. notatus* (Cassin), and *X. tricolor* (Cassin).

81. XENOCICHLA SYNDACTYLA, (Swainson).

Dasycephala syndactyla, Swains. B. of W. Afr. i. p. 261, (1837.)

Trichophorus syndactylus, (Swains.) Hartlaub.

This large and handsome species is in the collection from the Ogobai. It is the most shrike-like and rapacious species of this group that I have seen, and both generically and specifically is strongly characterized.

Large, bill straight, compressed. Tail and upper coverts bright rufous, upper parts dark olive, outer edges of quills with a tinge of rufous, under parts greenish yellow, palest on the throat, the green more distinct on the breast and sides. Total length about 9½ inches, wing 4½, tail 4 inches. Outer

united to the middle toe to the last joint, or for about two thirds of its length.

Several specimens from the Ogobai river.

82. XENOCICHLA NOTATA, (Cassin.)

Trichophorus notatus, Cassin, Proc. Acad. Philada. 1856, p. 159.

From the Camma, and formerly from the Moonda and Muni rivers. Easily distinguished by the large yellow spot in front of the eye, which is the color also of the under parts of the body, tinged with green on the breast and sides. Upper parts yellowish olive green, not so dark as in the preceding. Tail olive green, nearly the same as other upper parts, four outer feathers on each side, with large pale yellow spots at their tips, under wing coverts pale yellow. Total length about 7½ inches, wing 3¾, tail 3½ inches. Outer toe united to the middle for about half its length. Female smaller and with the bill shorter, but with the colors very nearly as in the male.

83. XENOCICHLA TRICOLOR, (Cassin.)

Trichophorus tricolor, Cassin, Proc. Acad. Philada. 1857, p. 33.

From the Camma and formerly from the Muni river. Smaller than either of the preceding two species. Tail and its upper coverts dark chestnut, slightly tinged with greenish, entire upper parts olive green, under parts greenish yellow, clearer on the throat and more shaded with green on the breast and sides, exposed ends of secondaries having a tinge of rufous or chestnut like the tail. Total length about 6½ inches, wing 3, tail 3 inches. Outer toe united to the middle slightly beyond the first joint. Female smaller than the male but similar in colors.

84. HEMIXOS SERINUS, (Verreaux.)

Criniger serinus, Verr. Cab. Jour. iii. p. 105, (1855, March.)

Criniger xanthogaster, Cassin, Proc. Acad. Philada. 1855, p. 327 (April.)

Specimens from the Camma and formerly from the Moonda. This bird is exactly the same genus to me as *Criniger ictericus*, Strickland, and another species labelled in the Acad. Coll. "*T. indicus*, Ceylon." Sexes alike.

85. HEMIXOS INDICATOR, (Verreaux.)

Criniger indicator, Verr. Cab. Jour. iii. p. 105, (March, 1855.)

Trichophorus leucurus, Cassin, Proc. Acad. Philad. 1855, p. 328, (April.)

This is a very bad *Hemixos*, but a worse *Criniger* or *Trichophorus*. It is a heavy and strong bird with the bill wider and thicker and the tail shorter than in either of the genera mentioned. It is for me the type of a generic or sub-generic group approaching *Cossypha* and *Geocichla* in form, but different in color.

Specimens from the Camma.

86. ANDROPADUS LATIROSTRIS, Strickland.

Andropadus latirostris, Strick. Proc. Zool. Soc. London, 1844, p. 100.

Frazer, Zool. Typ. Birds, pl. 35, (young.)

Bill and feet pale colored, and under mandible almost entirely white in both adult and young. Under wing coverts yellowish olive, fifth quill longest. Throat with a line on each side of pale yellow, very distinct in the adult, and generally to be traced in the young; entire upper parts dark olive, upper tail coverts and tail greenish brown. Middle of throat and breast olive, abdomen pale greenish yellow, tibiæ and under tail coverts reddish olive. Quills edged internally with dull white. Bill wide, depressed, serrations in upper mandible distinct. The young bird frequently has the wings tinged with the same reddish brown as on the tail. Total length 6¾ to 7 inches.

Specimens from the Camma and formerly from the Muni.

87. ANDROPADUS GRACILIROSTRIS, Strickland.

Andropadus gracilirostris, Strick. Proc. Zool. Soc. London, 1844, p. 100.

Bill and feet always dark horn color. Under wing coverts and inner edges of quills dark ochre yellow. Entire upper parts yellowish olive, under parts

greenish cinereous, tibiæ and under tail coverts pale rufous. Bill narrower and more slender than in the preceding. Total length about 7 inches. Serrations in the upper mandible not numerous but distinct.

From the Camma and formerly from the Moonda.

88. ANDROPADUS VIRENS, Cassin.

Andropadus virens, Cassin, Proc. Acad. Philada. 1857, p. 34.

Smaller than either of the preceding, and more nearly related to the typical *A. importunus*, of southern Africa. Bill and feet brownish horn color, the latter lighter. Under wing coverts pale greenish yellow, inner edges of quills very pale reddish white. Entire plumage olive, paler beneath, middle of abdomen yellow. Upper tail coverts and tail greenish brown. Total length about 6¼ inches.

This appears to be the most abundant species of Equatorial Africa, having been received in all of Mr. Duchaillu's collections.

89. ANDROPADUS CURVIROSTRIS, nobis.

About the size of *A. gracilirostris* and *latirostris*. Bill rather narrow, curved, serrations in upper mandible distinct. Under wing coverts pale greenish yellow. Upper parts olive, darker on the head, upper tail coverts and tail reddish brown, under parts lighter olive, tinged with reddish brown on the breast and sides and inclining to yellow on the abdomen. Quills dark brown, edged outwardly with olive, and on their inner edges with pale greenish yellow. Bill and feet bluish horn color, edges of both mandibles white. Total length about 6¾ inches, wing 3, tail 3 inches.

Hab.—River Camma, Western Africa. Discovered by Mr. P. B. Duchaillu.

This bird has the bill wider than in *A. gracilirostris*, and not so wide nor so strong as in *A. latirostris*, and more curved than in either. I have heretofore regarded it as the young of the former, but it appears to be a distinct species. Numerous specimens from the Camma and formerly from the Muni.

90. IXOS ASHANTEUS, Bonaparte.

Ixos ashanteus, Bonap. Consp. Av. i. p. 266.

Specimens from the Camma, and received in small numbers in several other of Mr. Duchaillu's collections.

91. IXONOTUS GUTTATUS, Verreaux.

Ixonotus guttatus, J. and E. Verreaux, Rev. et Mag. Zool. 1851, p. 306.

Evidently not an uncommon bird in Equatorial Africa. From the Camma, and formerly in other collections from Mr. Duchaillu.

GENUS PYRRHURUS, nobis.

Bill rather wide at base, upper mandible curved towards the end and distinctly notched, base with about 4 or 5 pairs of long and rather strong bristles. Wing rather long, first quill short, fifth longest, legs and feet strong, claws large, tail long, wide, rounded. Feathers of the head in front stiff and scale-like. Type *Phyllastrephus scandens*. Swainson.

92. PYRRHURUS PALLESCENS, (Hartlaub.)

Trichophorus pallescens, Hartl. Orn. W. Afr., p. 86, (1857.)

In the collection from the Ogobai are several specimens which agree so completely with Dr. Hartlaub's very careful description, cited above, that I cannot avoid the conclusion that they are the species intended, though he gives the locality of his specimens as "Gambia." The present specimens are precisely of the same generic form as *Phyllastrephus scandens*, Swainson, and resemble that species exceedingly in color also, but are smaller, as will be seen by Dr. Hartlaub's description, and constantly differ in the color of the under parts of the body and the under wing coverts. Specimens of *P. scandens* are in the Acad. coll., labelled in the handwriting of Mr. Jules Verreaux.

With undoubted specimens also before me of *Phyllastrephus capensis* from the Cape of Good Hope, it is very palpable that these birds are not of the same

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genus. In fact *P. capensis* has short wings, and *P. scandens* the wings long, and in other points of structure these birds are quite different, though belonging to the same group of Thrushes, and allied to *Ixos* and *Andropadus*.

93. PYRRHURUS LEUCOPLEURUS, (Cassin.)

Phyllastrephus leucopleurus, Cassin, Proc. Acad. 1855, p. 328.

Several specimens from the Camma do not vary materially from my description, as cited above. The affinities of this bird are more nearly to the preceding and *P. scandens* than to any African birds with which I am acquainted, but there are Asiatic species also to which it is related. The bristles at the base of the bill in the present bird are smaller than in the preceding.

This bird approximates to Asiatic birds, very confusedly given by authors as species of the genera *Brachypus*, *Napothera*, *Trichophorus* and others. It quite considerably resembles a species received from the Leyden Museum, labelled "*Trichophorus striolatus*, Müller, Java," but is larger and has the tail longer, though it is apparently of the same genus. There are also other birds in the Acad. coll. variously estimated generically, but of the same group as the present species. I arrange it here provisionally, until I can find out further.

94. MUSCIPETA FLAVIVENTRIS, Verreaux.

Muscipeta flaviventris, Verr. Cab. Jour. iii. p. 103, (1855.)

Muscipeta tricolor, Fraser?

A very beautiful species, varying much at different ages, but recognizable by the peculiar rich red orange or bay of the under parts. In the adult the plumage on the *upper* parts of the body is orange yellow at the base of the feathers, and on the rump the feathers are of the same color as the under parts, but tipped with bluish ashy. With some displacement of the feathers the rump might readily be supposed to be of the same color as the under parts. Specimens from the Camma and from the Moonda are nearly all young.

95. MUSCIPETA MELAMPYRA, Verreaux.

Muscipeta melampyra, Verr.

Specimens in several of Mr. Duchaillu's collections. From the Camma.

96. MUSCIPETA SMITHII, Fraser.

Muscipeta Smithii, Fraser, Proc. Zool. Soc. London, 1843, p. 34.

Another very handsome species recognizable without difficulty from the description as cited. This bird bears relations to both *Muscipeta nigriceps* (Hartlaub)* and *M. flaviventris*, Verreaux, and in fact looks like a specimen of the former, with the tail of the latter appended. Head glossy bluish black, back, rump, wing coverts and entire under parts fine orange-rufous, quills and tail brownish black, with a strong tinge of bluish ashy on the outer webs of the feathers. Total length about 7¾ inches. The black of the head extends further on the neck in this species than in *M. nigriceps*, and the color of the tail is entirely different, being fine reddish or chestnut orange in the latter.

97. MUSCIPETA MELANOGASTRA, Swainson?

Muscipeta melanogastra, Swains. B. of W. Afr. ii. p. 55, (1837)?

Specimens which I refer provisionally to this species are not adult, and but

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* MUSCIPETA NIGRICEPS, (Hartlaub.)

"Tchitrea nigriceps, Temm." Hartl. Orn. W. Afr. p. 91.

Velvet-headed Flycatcher, Lath. Gen. Hist. vi. p. 198.

Both sexes of this species are in the Acad. coll., having been received in Dr. Macdowell's collection from St. Paul's river. Head and throat glossy purplish black, quills dark brown, all other parts of the plumage, including tail, rich orange rufous, inclining to chestnut on the breast, tail with the middle feathers much the longest in the male. Female with the tail short, head and throat dark brown, all other parts of the plumage dull orange rufous. Total length, ♂ about 9½ inches, ♀ about 6 inches.

few only have been received from Mr. Duchaillu. With numerous specimens of *M. melanogastra* in various stages of plumage, from the Gambia in the Acad. Coll., I cannot avoid suspecting that the adult of the birds in the present collection would be different. The young are much alike in general characters.

98. MUSCIPETA SPECIOSA, nobis.

Generally resembling *M. melampyra*, Verreaux, but smaller and with the tail long, and having a white longitudinal stripe on the wing like *M. melanogastra* and *M. rufiventris*. Tail long, with the two middle feathers much the longest, others graduated, wing moderate, fifth quill longest, bill stout, rather wide and thick but not so long as usual in this genus, bristles at base of both mandibles conspicuous. *Upper tail coverts* in adult glossy black. Head, neck and breast glossy black with a green lustre, abdomen and *under tail coverts* dark bluish ashy or nearly black, wing coverts and quills black, greater wing coverts widely edged with white, secondary quills widely edged externally with white, (forming a conspicuous white spot on the wing coverts, continued in a longitudinal stripe on the quills). Under wing coverts dark ashy, nearly black, same as the under parts of the body. Upper parts of body fine rufous chestnut, shorter quills edged with rufous chestnut. Tail rufous, rather lighter than the back, all the feathers edged towards the end with brownish black, and the middle feathers brownish black along their shafts and tipped with that color. Bill and feet black.

Total length from tip of bill to end of tail about 9 inches, wing $3\frac{1}{8}$, tail 6, middle tail feathers exceed the next pair by $2\frac{1}{2}$ inches, bill from gape $\frac{3}{4}$ inch.

Hab. Camma river, Western Africa. Discovered by Mr. P. B. Duchaillu.

This is a species of the same general appearance as *M. melanogastra*, *holoserica*, *rufiventris* and others, and resembling in colors, especially of the under parts of the body, *M. melampyra* as stated above. In *M. melampyra*, the under tail coverts are bright rufous, and it has no white stripe on the wing. In the present species, the under tail coverts are dark ashy, exactly the same as the abdomen, and the white spot and stripe on the wing are very conspicuous. The *upper tail coverts*, especially the longest of them, next to the tail are *lustrous greenish black* in the present bird, which character distinguishes it from all other species with which I am acquainted. There is no other known African species that has the under tail coverts dark cinereous, except *M. senegalensis*, Lesson, which, however, only generally resembles the present bird, so far as can be gathered from the descriptions.

99. MUSCIPETA DUCHAILLUI, nobis.

Generally resembling the Asiatic *M. paradisi*, (Linnæus) but smaller and with the long feathers of the tail white in both sexes. Crested, bill wide, somewhat depressed, bristles at the base of both mandibles long and conspicuous, wing moderate, fifth quill longest, middle feathers of the tail long, others graduated. Male, adult.—Back, rump and upper tail coverts *reddish chestnut*, head and breast shining greenish black, abdomen dark ashy. Quills brownish black, greater wing coverts and tertiary quills widely edged with white, forming a very conspicuous white longitudinal stripe on the wing, under wing coverts dark ashy (same as abdomen) middle tail feathers white, with their shafts black at the base, outer tail feathers brownish black, several of the longer edged with white on their inner webs. Female, adult.—Back, rump, upper tail coverts and tail *snowy white*, the shafts of the tail feathers for about half the length of the middle feathers and throughout the others, black. Crested, head and breast shining greenish black, (as in the male) abdomen and under tail coverts white, the former mixed and striped with black on the flanks, quills brownish black, greater coverts and outer edges of tertiaries white, under wing coverts white. Bill and feet ashy bluish brown. Young ♂. Upper parts white as in the female, but with longitudinal stripes of black, outer tail feathers brownish black, edged with white, abdomen dark ashy, nearly black.

Total length about 14 inches, wing $3\frac{1}{4}$, tail 10, middle feathers exceed the others by 6 inches.

Hab.—Camma river, Western Africa. Discovered by Mr. P. B. Duchaillu.

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This is one of the most remarkable birds yet discovered by Mr. Duchaillu, and is also one of the handsomest species of Flycatchers yet known to inhabit Western Africa. In general characters, this bird resembles the well known Asiatic *Muscipeta paradisi*, and, as in that species, the male is chestnut colored on the upper parts of the body, and the female is white. The present bird has also relations to *M. mutata*, and others of Southern and Eastern Africa, but is quite different.*

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* The following species of *Muscipeta* are in the Museum of this Academy.

Asiatic.

1. Muscipeta paradisi, (Linnæus) Le Vaill. Ois d'Afr. iii. pl. 144, 145.
2. Muscipeta affinis, (Hay.)
3. Muscipeta rufa, (G. R. Gray,) Gray's Genera, i. pl. 64.
4. Muscipeta leucogastra, Swainson, Flycatch. Nat. Lib., pl. 24.
5. Muscipeta principalis, Temm., Faun. Jap. Birds, pl. 17.
6. Muscipeta cyaniceps, Cassin, Voy. Vincennes, Birds, pl. 9, fig. 1.

African.

7. Muscipeta cristata, (Gmelin,) Le Vaill. Ois d'Afr., iii. pl. 142, 143.
   Numerous specimens from the Cape of Good Hope, and one specimen from "Nova Redonda, Western Africa." The latter collected and presented by Dr. A. A. Henderson, Surgeon, U. S. Navy.
8. Muscipeta borbonica, (Gmelin.)
9. Muscipeta melanogastra, Swainson.
   Specimens from Gambia and others from Equatorial Africa, received from Mr. Duchaillu. The latter I assign to this species with some hesitation.
10. Muscipeta rufiventris, Swainson, B. of W. Afr., ii. pl. 4.
11. Muscipeta mutata, (Gmelin.) Le Vaill. Ois. d'Afr., iii. pl. 148.
12. Muscipeta holosericea, (Temminck) Le Vaill. Ois. d'Afr. iii. pl. 147.
13. "Muscipeta Gaimardi, Madagascar." Label in Rivoli Collection.
    The last three names I regard as possibly applicable to one species only, in stages of plumage analogous to those of *M. paradisi*, and of my *M. Duchaillui*, but I advance this as an opinion only, at present. These three are all labelled in the Acad. Coll. as from Madagascar. The last seems to be *Tchitrea Gaimardi*. Lesson, Traité, i. 386, which is stated to be from New Guinea, an error corrected by M. Pucheran, in Arch. du Mus. Paris, vii. p. 372.
14. Muscipeta Ferreti, (Guerin), Ferret et Galinier, Voy. Abyssinia, Ois. pl. 8.
    Specimens of both sexes from Abyssinia.
15. Muscipeta flaviventris, (Verreaux).
16. Muscipeta melampyra, (Verreaux).
17. Muscipeta Smithii, Fraser.
18. Muscipeta nigriceps, (Hartlaub).
19. Muscipeta speciosa, Cassin.
20. Muscipeta Duchaillui, Cassin.

Of these species there are several subgeneric groups, one of the most distinct of which is composed of *M. flaviventris*, *Smithii*, and *melampyra*. In addition to the species here given, there are various others in the Acad. Coll., nearly related, if not actually entitled to be included in the genus *Muscipeta;* for instance, *Muscicapa pyrrhoptera*, Temm., which is placed by Bonaparte in the genus *Philentoma*, Eyton, but with doubtful propriety as a congener of *P. velatum* and *Muscicapa cyanomelas*. For me, the first three species of *Philentoma*, as arranged by Bonaparte, (Consp. Av. i. p. 314,) belong to three different genera. The fourth species I do not know.

To this beautiful species, I have great pleasure in applying the name of Mr. Duchaillu, who, in the three years past, during which he has been in Africa, has fairly earned the distinction of being the most successful zoological traveller of the present time, and who has, in ornithology especially, made very important discoveries.

100. TROCHOCERCUS NITENS, nobis.

Of the same generic group as *Muscicapa cyanomelas*, Vieill. Le Vaill. Ois. d'Afr. iv. pl. 151, and in some measure resembling that species. Crested, bill smaller and more narrow than in typical species of *Muscipeta*, wing moderate, fifth quill longest, tail moderate, bristles at the base of both mandibles strong, and nearly as long as the bill.

♂. Head, breast, and entire upper parts glossy bluish black, which is also the color of the wings and tail. Abdomen and under tail coverts light cinereous, very pale or nearly white next to the black color on the breast, under wing coverts white, bill and feet bluish gray.

♀. Top of head (or crest) only glossy black as in the male, back and other upper parts dark cinereous, (without lustre,) wings and tail ashy black. Entire under parts light cinereous, darker on the throat and breast, and very pale on the abdomen, under wing coverts light ashy, nearly white. Total length, ♂, about 5¾ inches, wing 2½, tail 2¾ inches. ♀ slightly smaller.

Hab.—Camma river, Western Africa. Discovered by Mr. P. B. Duchaillu.

This is a second species of the same group to which belongs *Muscicapa cyanomelas*, Le Vaill. Ois. d'Afr. iv. pl. 151, as stated above, but is a very distinct and well marked species, entirely without the white scapulars and tertiaries which so strongly mark that bird, and are well represented in Le Vaillant's plate cited above. In the male, the head and breast and entire upper parts of the body, including the wing coverts and shorter quills, are lustrous bluish black, changing to greenish according to the light. The abdomen is clear ashy, very pale next to the black of the breast, and there almost assuming the form of a transverse narrow band of ashy white.

Several specimens of both sexes of this interesting little bird are in the collection from the Camma and Rembo rivers.

101. TROCHOCERCUS ——?

Several specimens of young birds in the collection from the Camma seem to indicate a third species of this group larger than either *T. cyanomelas* or *T. nitens*. Young of both sexes resemble the females of both the species just mentioned, but are of darker cinereous, and like them have the crest only black. The bill is larger and more depressed. I do not regard it as expedient to propose a new specific designation in this difficult family, without having adult specimens.

102. BIAS MUSICUS, (Vieillot.)

Platyrhynchus musicus, Vieill. Nouv. Dict. xxvii. p. 15.
Myiagra flavipes, Swains. Flyc. Nat. Lib. p. 255, 308.

Specimens from the Camma and formerly from the Moonda. Young ♂. Like the female, but with the entire plumage mixed with black feathers.

103. ARTOMYIAS FULIGINOSA, Verreaux.

Artomyias fuliginosa, J. & E. Verreaux, Cab. Jour. 1855, p. 104, (March.)
Butalis infuscatus, Cassin, Proc. Acad. Philada. 1855, p. 326, (April.)

From the Camma and formerly from the Moonda and Cape Lopez.

104. PLATYSTIRA MELANOPTERA, (Gmelin.)

Muscicapa melanoptera, Gm. Syst. Nat. i. p. 939, (1788.)
Jard. and Selb. Ill. Orn. i. pl. 9.

Numerous specimens in all of Mr. Duchaillu's collections.

105. PLATYSTIRA LEUCOPYGIALIS, Fraser.

Platystira leucopygialis, Fras. Proc. Zool. Soc. London, 1842, p. 142.
Platystira castanea, Fras. ut sup. p. 141
Frazer Zool. Typ. Birds, pl. 34.

From the Camma and Ogobai.

106. MUSCICAPA GRISOLA, Linnæus.
Muscicapa grisola, Linn. Syst. Nat. i. p.
Butalis Africana, Bonap. Comptes Rendus, 1854, p. 652?
Gould, B. of Eur. pl. 65. Naumann, B. Germ. pl. 64.
Several specimens from the Ogobai and Rembo, not distinguishable from the European bird, but are not in fully adult plumage. In the African specimens the bill is smaller than usual in this species from Europe, but they do not appear to be specifically distinct.

107. MUSCICAPA, ———?
A second species of typical *Muscicapa*, in the collection from the Camma, but which I cannot identify with any species or description with which I am acquainted. Adult ♂. Upper parts clear bluish-ashy, lighter on the rump, and with longitudinal lines of brownish black on the head. Throat and abdomen white, breast pale ashy, nearly the same as the back, under wing coverts ashy white, quills and tail brownish black. An obscure line of ashy white in front of the eye. Bill and feet black. Young ♂. Upper parts cinereous, many feathers, with large terminal spots of dull yellowish, under parts dull white, with spots and edging of brownish black. Tail black, narrowly tipped with white.
Total length about 5 inches, wing 2¾, tail 2¼ inches.

108. MUSCICAPA EPULATA, (Cassin).
Butalis epulatus, Cassin, Proc. Acad. Philada. 1855, p. 326.
Specimens show some difference in the shade of ashy of the upper parts, but appear to be identical. In the more adult the lower mandible and the feet are light colored or nearly white in the dried skin. From the Camma.

109. ERYTHROCERCUS MCCALLII, (Cassin).
Pycnosphrys McCallii, Cassin. Proc. Acad. Philada. 1855, p. 326.
A single specimen from the Camma, not different in any respect from that formerly received from the Moonda.

110. HYLIOTA VIOLACEA, Verreaux.
Hyliota violacea, Verreaux, Rev. et Mag. Zool. 1851, p. 308.
From the Camma and formerly from the Moonda.

111. FRASERIA OCREATA, (Strickland).
Tephrodornis ocreatus, Strickl. Proc. Zool. Soc. London, 1844, p. 102.
Fraser, Zool. Typ. Birds, pl. 36.
Both sexes from the Camma. The dark edgings of the plumage of the breast varies in different specimens, in some extending to the sides and abdomen, in others nearly obsolete. Sexes nearly alike in colors, female smaller.

112. FRASERIA CINERASCENS, Hartlaub.
"Stiphrornis cinerascens, Temm. Mus. Lugd." Hartl. Orn. W. Afr. p. 102.
This species much resembles the preceding, but is smaller, and can be easily distinguished by the white spot in front and over the eye, which is present in both sexes at all ages. Sexes very nearly alike, but the female and young male generally have the breast and flanks strongly tinged with dull fulvous or ochre color. From the Camma and Ogobai.

113. PARISOMA MELANURUM, nobis.
About the size of *P. subcaeruleum*, (Vieill.) Le Vaill. Ois. d'Afr. iii. pl. 126. Bill rather thick, upper mandible distinctly notched, under mandible with the ridge ascending, wing moderate, first quill short, fourth longest, tail rather long, legs rather long. Middle six feathers of the tail black, outer two white, intermediate black, tipped with white. Entire plumage cinereous, darker on the head and upper parts of the body, lighter on the throat and breast, and nearly white on the abdomen. An obscure white line in front of the eye. Under wing coverts ashy white, under tail coverts pale fulvous. Quills brown edged externally with ashy white. Bill light corneous, under mandible white

at base, tarsi light bluish. Young ♂. Entire under parts ashy, many of the feathers edged with light rufous, under tail coverts pale rufous, upper parts darker ashy, wing coverts and quills edged with pale rufous. Total length about 5¼ inches, wing 2⅝, tail 2½ inches.

Hab. Camma river, Western Africa. Discovered by Mr. P. B. Duchaillu.

About the same size as the South African *Parisoma*, mentioned above, but with the bill thicker and longer. In the young bird the under tail coverts are pale rufous, which color becomes more indistinct, and assumes a fulvous shade in more advanced age. Several specimens from the Camma and Rembo. Sexes alike.

114. PARISOMA OLIVASCENS, nobis.

About the size of the preceding, or slightly larger; bill shorter and thicker, tail rather long. Entire upper parts ashy olive, wings and tail olive brown, quills edged externally with pale yellowish ashy, and internally with white. Throat, and under tail coverts white, breast and abdomen greenish ashy, paler on the latter, under wing coverts white. Upper mandible bluish corneous, under mandible yellowish white, legs pale colored. Total length 5½ inches, wings 2¾, tail 2½ inches.

Hab. Camma river, Western Africa. Discovered by Mr. P. B. Duchaillu.

This bird is of the same general form as the preceding, but has the bill stronger, and the colors of the plumage are entirely different. The tail in the present bird is greenish brown, the outer feathers more distinctly edged with ashy olive, very nearly uniform with the upper parts of the body. One specimen only is in the collection from the Camma, and is labelled as a male. Both the species here described have the bills longer and thicker than *P. subcaeruleum*.

Genus HYPODES, nobis.

Allied to *Parisoma*, but with the general form shorter and stronger. Tail short, bill thick, rather wide at base, upper mandible distinctly notched at the tip, bristles at base of the upper mandible distinct, wing moderate or rather long, first quill short, third and fourth longest and nearly equal, legs and feet moderate, or rather slender. Type *Eopsaltria cinerea*, Cassin.

115. HYPODES CINEREA, (Cassin).

Eopsaltria cinerea, Cassin, Proc. Acad. Philada. 1856, p. 253.

This little bird is allied to the preceding two species, but is generically distinct, and has the tail short, while in those the tail is rather unusually long. In my judgment this bird and *Parisoma* are not distant relations of *Vireo* and *Eopsaltria*.

116. CAMPEPHAGA NIGRA, Vieillot.

Campephaga nigra, Vieill.

Le Vaill. Ois. d'Afr. iv. pl. 165.

There is a constant difference in the metallic lustre of different specimens, almost inclining me to the opinion, that they are two species. Both are entirely black, and about the same size, but the lustre of one is green, and of the other rich purple and violet. The former is strictly identical with South African specimens in Acad. Coll.

From the Camma, and formerly from the Muni.

117. LOBOTOS TEMMINCKII, Hartlaub?

Lobotos Temminckii, Hartl. Orn. W. Afr. p. 99?

Ceblepyris lobatus, Temm. Pl. Col. 279, 280?

A single specimen labelled as a young male, is either this species or an undescribed bird. It much resembles the figure of the female given by Temm. in Pl. Col. 280, but has the entire head cinereous, darker on the top of the head, lighter and nearly white on the throat. Upper part of body yellowish olive, under parts fine yellow, quills dark brown, edged internally with yellow, tail olive, external feathers with their outer webs yellow. Total length 7¼ inches.

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118. CEBLEPYRIS AZUREA, (Cassin.)

Graucalus azureus, Cassin, Proc. Acad. Philada. 1851, p. 348.

Two specimens in the collection from the Camma, and so far as I am informed the only known specimens except that formerly received from Dr. Macdowell, and described by me as above. It is with much gratification that I record the second occurrence of this species, which is quite peculiar amongst the African birds of this group, and is strongly distinguished by its uniform blue plumage. The present specimens are fully adult, being rather larger than that described by me, and have the quills uniform clear black, without the white transverse lines at the end, which are in the original specimen, and seem to mark a younger bird. Total length about 8 inches. The general appearance of this bird is not unlike that of the young or immature plumage of *Irena puella* of Asia.

119. DICRURUS CORACINUS, Verreaux.

Dicrurus coracinus, J. & E. Verreaux, Rev. et Mag. Zool. 1851, p. 311.

From the Camma and Ogobai, and strictly identical with specimens from Mr. Verreaux, in the museum of this Academy,

120. DICRURUS ATRIPENNIS, Swainson?

Dicrurus atripennis, Swains. B. of W. Afr. i. p. 256?

Several specimens which I doubtfully refer to this species. It is smaller than the dimensions given by Swainson as above, the total length being about 8 inches, but is evidently nearly allied, if not identical with his species. This bird has the tail but very slightly forked, and bears relations also to my *D. aculeatus* and to *D. Ludwigii*, Smith, of Eastern and Southern Africa, both of which are now before me. *D. atripennis* is not in the Academy collection.

121. SIGMODUS RUFIVENTRIS, Bonaparte.

Sigmodus rufiventris, Bonap. Rev. et Mag. Zool. 1853, p. 441.

Several specimens from the Ogobai and formerly from the Moonda. Sexes alike, except that in the female the head above is clear white, without the tinge of cinereous generally to be seen in specimens. This species is rather smaller and quite distinct from *S. caniceps.* Temminck.

122. LANIARIUS CRUENTUS, (Lesson.)

Vanga cruenta, Less. Belanger's Voy. Zool. p. 256, (1834.)

"Harcolestes hypopyrrhus, Bonaparte," Verreaux, Rev. et Mag. Zool. 1855, p. 419.

Lesson, Cent. Zool. pl. 65.

Very fine specimens of this beautiful species are from the Ogobai and Rembo and formerly from the Moonda. The female is similar to the male in general characters, but is rather smaller and has the colors less distinct.

123. LANIARIUS CHLORIS, (Dumont.)

Lanius chloris, Dumont, Dict. des Sci. Nat. xi. p. 226, (1826.)

Malaconotus Peli, Bonaparte, Consp. Av. i. p. 360, (1850.)

Laniarius lepidus, Cassin, Proc. Acad. Philada. vii. p. 327, (1855.)

The description of *Lanius chloris*, as cited above, is not sufficient to identify it with this or any other species. In applying this name to the bird now before me, I rely entirely on the conclusion of Dr. Hartlaub, in Orn. W. Afr., p. 109, and necessarily disregarding the statement made by the Prince Bonaparte that *L. chloris* is a second species of the genus *Ixonotus*, Verreaux (Comptes Rendus, Acad. Paris, 1854, p. 533.)

From the Camma, and received in all the collections from Mr. Duchaillu.

124. DRYOSCOPUS AFFINIS, G. R. Gray.

Dryoscopus affinis, G. R. Gray, Ann. & Mag. Nat. Hist. 1837, p. 489.

Specimens from the Ogobai and others from the Moonda, that I cannot distinguish from others in the Acad. Coll. from Zanzibar.

125. DRYOSCOPUS MAJOR, (Hartlaub.)
Telophonus major, Hartl. Rev. Zool. 1848, p. 108.
Trans. Nat. Hist. Soc. Hamburg, 1848, pl. 5.
Specimens of both sexes from the Camma.

126. DRYOSCOPUS CARBONARIUS, (Cassin.)
Laniarius carbonarius, Cassin, Proc. Acad. Philada. 1851, p. 347.
Telophonus leucorhynchus, Hartlaub, Rev. Zool. 1848, p. 108?
Trans. Nat. Hist. Soc. Hamburg, 1848, pl. 6?
Though the names here given seem to be regarded as certainly synonymous by very reliable ornithologists, I have never been able to reconcile that conclusion with the fact that both sexes of my *D. carbonarius* have the bill black. In *T. leucorhynchus*, the bill of the male is white, and that of the female black, and the measurements given as above, and elsewhere, with his usual accuracy, by Dr. Hartlaub, are smaller than in specimens of my species.

There are, in Mr. Duchaillu's collections, numerous specimens of *L. carbonarius* of both sexes, and very similar in all their characters, but previous to the arrival of the present collection from the Camma, I had never seen a specimen with the bill light colored, or of any other color than black. In this collection, however, there are two specimens evidently not in mature plumage, one of which, labelled as a male, has the bill varied with dull brownish black and pale yellowish white, and showing a tendency to become either white or black, but impossible to determine which. These two specimens are smaller than those of *L. carbonarius*, being very nearly the size given by Dr. Hartlaub, and have the plumage more strongly tinged with brown as represented in his plate cited above. My opinion is, at present, that the two species are distinct.

From the Camma and Ogobai, and formerly from the Moonda.

127. CHAUNONOTUS SABINEI, (J. E. Gray).
Thamnophilus Sabinei, J. E. Gray, Zool. Misc. p. 7, (1842).
Hapalophus melanoleucus, Verreaux, Rev. et Mag. Zool. 1851, p. 312.
Jard. and Selby, Ill. Orn. n. s. pl. 27.
From the Camma, and formerly from the Muni and Moonda.

128. TURDIROSTRIS FULVESCENS, nobis.
Of the same genus as "*Myiothera philomela*, Temm. Borneo," and very nearly related to "*Myiothera inornata*," "*Trichostoma umbratile*," and "*Trichostoma celebense*," of the Acad. Coll. and generally resembling those species in colors, but larger than either of them. Bill rather large, wing moderate, rounded, fifth quill longest, tail moderate, rounded, legs rather long, feathers of the back long, soft, bristles at the base of the bill strong. Head above dark ashy brown, cheeks ashy, throat ashy white. Upper parts of body reddish-brown, with a tinge of olive on the back, and becoming clear dark ferrugineous on the rump and upper tail coverts. Under parts of body dull ashy white, much tinged with dull ochraceous or fulvous on the breast and sides. In some specimens the entire under parts are dull reddish fulvous. Quills dark brown, edged externally with the same color as the back, tail dark chestnut brown. Bill with the upper mandible horn color, under mandible yellowish white, legs light brownish. ♀. Smaller, and with the plumage more strongly tinged with ferrugineous on the upper parts, throat ashy white, under parts of body ashy white in some specimens, dull fulvous in others.

Total length, ♂, about 6 inches, wing 3, tail 2⅝ inches. ♀ Total length about 5¾, wing 2¾, tail 2½ inches.

Hab. River Camma, Western Africa. Discovered by Mr. P. B. Duchaillu.

To me this bird is exactly the same genus as a species in the Acad. Coll. labelled in Europe, "*Myiothera philomela*, Temm. Borneo," and is nearly related to others as stated above. Its colors much resemble those of the species just mentioned, and also of "*Trichostoma umbratile* and *celebensis*," of which very indifferent figures are given in Jardine's Cont. Orn. for Nov. 1849. The tails in

these two birds are not unusually short as represented in the plate alluded to, and in other respects the figures are scarcely recognizable with the original specimens before me. These species are included in the genus *Turdirostris*, Hay, Bonap. Comp. Av. i. p. 217.

The present bird presents considerable diversity in the shade of colors, and especially in the greater or less prevalence of ferrugineous or dark fulvous on both the upper and under parts of the body. So far as I know, it is the first species yet ascertained to inhabit Western Africa, of a group of birds quite numerous in the islands of the Malay Archipelago, at about the same latitude of Mr. Duchaillu's operations, or within a few degrees of the Equator. In fact, species from equatorial Africa, similar to others in the equatorial Asiatic Islands, have now been discovered to such extent as to be quite remarkable.

With this species I conclude the *Dentirostres* of the present very interesting collection, and hope to continue this Catalogue without intermission next month.

In accordance with the by-laws, the following members were elected on the Standing Committees for the present year.

1. *Ethnology*, J. A. Meigs, S. S. Haldeman, T. G. Morton. 2. *Comparative Anatomy and General Zoology*, Joseph Leidy, James M Corse, W. A. Hammond. 3. *Mammalogy*, John Le Conte, J. H. Slack, Wm. Camac. 4. *Ornithology*, John Cassin, T. B. Wlson, S. W. Woodhouse. 5. *Herpetology and Ichthyology*, Edward Hallowell, Robert Bridges, J. C. Morris. 6. *Conchology*, T. A. Conrad, W. G. Binney, W. S. W. Ruschenberger. 7. *Entomology and Crustacea*, Robert Bridges, John L. Le Conte, J. J. Brown. 8. *Botany*, Elias Durand, A. J. Brazier, Joseph Carson. 9. *Geology*, Isaac Lea, C. E. Smith, J. P. Lesley. 10. *Mineralogy*, W. S. Vaux, J. C. Trautwine, W. G. E. Agnew. 11. *Palæontology*, T. B. Wilson, Joseph Leidy, T. A. Conrad. 12. *Physics*, B. H. Rand, W. M. Uhler, Edward Tilghman. 13. *Library*, W. S. Vaux, Isaac Barton, T. B. Wilson. 14. *Proceedings*, John L. Le Conte, Joseph Leidy, W. S. Vaux, G. Scull, W. S. W. Ruschenberger.

February 1*st*.

Vice President BRIDGES in the Chair.

Forty members present.

A paper was presented for publication in the Proceedings, entitled Ichthyological Notices, by Charles Girard, M. D., and was referred to a Committee.

The resignation of Thomas B. Wilson, M. D., as member of the Committees on Palæontology and the Library, tendered this evening, was accepted.

On motion of Mr. Cassin, a special vote of thanks was given to Mr. James Hammill, for his handsome donation of the skeleton of a horse, received this evening.

Feb. 8th.

DR. HAYS in the Chair.

Twenty-nine members present.

Dr. Rand announced the death at sea, on his return from China, of Captain McMichael, late a member elect of the Academy.

Feb. 15th.

Vice President BRIDGES in the Chair.

Thirty-eight members present.

Papers were presented for publication of the Proceedings, entitled, Observations on the Species of Nicotiana, by John Le Conte.

Catalogue of the Coleoptera of Fort Tejon, California, by John L. Le Conte, M. D.

And were referred to Committees.

Mr. Powel read extracts from a letter, giving information in relation to certain fossil bones in the neighborhood of Enfield, North Carolina.

Feb. 22d.

Vice President BRIDGES in the Chair.

Forty members present.

On report of Committees on the Biological Department, the following named papers were recommended for publication in a medical journal.

Observations on the exposed hearts of Animals, by S. Weir Mitchell, M. D.

Observations on the colorless blood-corpuscle, by Wm. A. Hammond, M. D.

The following papers were, on report of the respective Committees, ordered to be printed in the Proceedings:

ICHTHYOLOGICAL NOTICES.

BY CHARLES GIRARD, M. D.

V. We have often had an opportunity to speak of curious traits of organization amongst the fishes of California and Oregon, but we think that the species which is the subject of this paragraph, yields nothing in that respect to those alluded to elsewhere.

Let it be stated at once that it belongs to the blennioid family, as now understood by us, and will enter into the genus *Neoclinus*, as characterised in the "Report upon the Fishes of the U. S. P. R. R. Expl. and Surveys," without any material modification of its diagnosis. And yet when we first beheld this singular creature—prior to any examination of its organic structure—we were far from suspecting its natural affinities to the family to which it belongs in reality. The fish is from eight to nine inches in total length; its body is very much compressed and tapering; the head being about two inches long and deeper than broad, superiorly convex, anteriorly rounded off; the branchial apertures are widely open, continuous under the throat; the mouth is deeply

cleft; the pectorals and ventrals, and the fins generally, assume a position and an aspect, not departing from the normal rule in that family. In the characters thus far enumerated, there is nothing to attract very particularly the attention, except, perhaps, the broad exit to the respiratory stream; and, as far as the dentition is concerned, we have already stated its type by referring the species to the genus *Neoclinus*. But now imagine a fish with all these characters, provided with a mouth very wide and deeply cleft, with the maxillar bones in their usual position, developed beyond all proportions; so much so that their posterior extremity, which is considerably dilated, extends beyond the branchiostegal apparatus. Between the cheeks and the inner edge of the maxillar bones there is a connecting membrane, which measures about an inch and a half along its posterior edge, and gives the mouth an enormous amplitude when viewed in front; both maxillars stretched. The same membrane extends from the angle of the mouth, along the lower jaw to near its apex or symphysis, towards which it tapers. That abnormal development of the maxillar bones reminds us of a similar peculiarity of structure in *Opistognathus sonnerati*, upon which species the genus *Opistognathus* was founded. Another species of the same genus *Opistognathus*, however, *O. cuvieri*, does not possess the same feature, and the generic characters of *Opistognathus* are now derived from other structural traits. In treating of *Neoclinus* it will be recollected, we alluded to the natural affinities between these two genera. They differ chiefly by the dentition and the structure of the ventral fins: *Neoclinus* having conspicuous palatine teeth and three articulated rays only to the ventrals; whilst *Opistognathus* has the palate toothless, or nearly so, and is provided with five articulated rays to its ventral fins. The pectorals, dorsal, anal and caudal fins present the same general appearance in both genera. Even the scales are similar: they being small, imbricated and cycloid in their structure. The air bladder, which is wanting in *Neoclinus*, is extant in *Opistognathus*.

It is more than probable that had we been acquainted with this second species of *Neoclinus* first, we would have been misled as to its real generical characters, and framed a name in allusion to the condition of the upper jaw, such as *Pterognathus* for example, which would have been most characteristic, for that upper jaw is as truly winged as the anterior members of the flying squirrels. We cannot help thinking that Cuvier himself would not have coined the name of *Opistognathus* had he had before him the species which bears his name, instead of that which he dedicated to Sonnerat.

These two genera (*Opistognathus* and *Neoclinus*,) will furnish one of the best themes to ichthyological studies, as they exemplify the fact that *specific characters* may be developed to exaggeration, and become more conspicuous than the *generic characters* themselves.

Returning now to the principal object of this paragraph, which is to record a second species in the genus *Neoclinus*, and to which we give the name of *N. satiricus*, the chief difference between the latter and *N. blanchardi* resides in development of the maxillar bones, above alluded to. The cephalic membranous flaps or tentacles, which we noticed in the species formerly described, do not appear to exist in the present one; so that their expression will have to be stricken out from the generical diagnosis. The formula of the rays: Br. VI: VI; D 42; A 29; C 3, 1, 5, 4, 1, 4; V 1, 3; P 14, bears a great resemblance to that of *N. blanchardi;* we have not been able to ascertain how many of the rays of the dorsal fin are simple and unarticulated. The insertion of the ventrals takes place somewhat more in advance of the pectorals than in the species just alluded to.

The color is uniform olivaceous brown, with a bluish black tint prevailing over the sides of the head and the fins. The maxillar membrane is posteriorly white edged, as in *N. blanchardi*.

The only specimen of this species that has come to our knowledge, was caught at a depth of thirty fathoms, in the Bay of Monterey, Cala., and sent to the museum of the Smithsonian Institution by A. S. Taylor, Esq., to whom

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science is already indebted for some of the rarest ichthyological and carcinological productions of the Pacific coast.

VI. A few months have scarcely elapsed since we stated that no representatives of the sub-order of apod malacopterian fishes had so far been observed along the Pacific coast, west of the United States. We are now in possession from that coast of a fine species, which, according to Kaup's classification, belongs to the family *Ophisuridæ*, and more properly still to the subfamily *Myrophinæ*. Its generical affinities are with *Myrus*, from which it, however, differs by the dentition and the condition of the dorsal fin. The genus to which it belongs may be characterized as follows: Pectoral fins present. Origin of dorsal fin situated near the occiput, in advance of the base of the pectorals. Head large, subconical, lower jaw shorter than the upper. Teeth granular, disposed upon elongated patches, on the jaws, palate and nasal bones Eyes well developed. Gill apertures lateral, of moderate development, and placed vertically in advance of the pectoral fins. Body scaleless.—A specimen from Adair Bay, Oregon, measures about two feet in total length. Its body is subcylindrical, somewhat compressed, and tapering gradually backwards. The origin of the dorsal fin takes place near the occipital region, upon a vertical line somewhat nearer the base of the pectorals than the posterior rim of the eye. The beginning of the anal fin is nearer the extremity of the snout than the tip of the tail. The pectoral fins are subelliptical in their outline, broader than long. The head, from the apex of the rostrum to the branchial aperture, measures about two inches, or else the twelfth part of the total length; it is subconical, anteriorly attenuated, the upper jaw projecting considerably beyond the lower one. The gape of the mouth is nearly horizontal; its angles extending considerably beyond the orbits. The teeth are subconical or hemidiscoid, granular or sand like in general appearance and of various sizes; very small ones occupying the intervening space between the largest. They are disposed upon multiple series: three of these may be observed towards the anterior portion of the dentary (lower jaw), whilst one only extends backwards along that bone. There is a double series of them at the upper jaw; a double series also along the shaft of the vomer, the latter being continuous forwards with the nasal patch, where three or four series exist. The nostrils approximate the apex of the rostrum; the upper ones are very small, and placed opposite the inferior ones, which are conspicuous and tubular. The eyes are subelliptical and well developed; their longitudinal diameter entering twice upon the rostral distance anterior to the orbits.

The ground color is brownish olive, except the throat and belly which are of a dull whitish tint. Rounded, dark brown spots, rather diffuse at their periphery, constitute four longitudinal series from head to tail, leaving but the abdominal region unicolor, for the throat exhibits small, blackish spots. The spots about the head are likewise a good deal smaller and of a deeper hue than along the rest of the body. The fins are olivaceous; the anal and pectorals being unicolor, whilst the dorsal fin is edged with white and exhibits moreover a series of spots similar to those observed on the body.

We have selected the name of *Myrichthys tigrinus* for the above species. The specimen upon which the foregoing observations were made, was caught in Adair Bay, Oregon, by Capt. C. P. Stone, and presented to the Museum of the Smithsonian Institution.

VII. A few years ago we have established the genus *Cyprinella* to include sundry species of small cyprinoid fishes apparently very numerous in the rivers and streams lying westwardly to the main bed of the Mississippi, as well as in Texas and the Mexican provinces adjoining the Rio Grande del Norte (Rio Bravo). Up to the time our reports upon these fishes passed through the press, we had not met with any species of that genus east of the Alleghany range. We are now in possession of numerous specimens of various sizes, from an inch to three inches in total length, which appears to be the full grown

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condition of the species. They were obtained from the waters of Rock creek, which flows into the Potomac river nearly opposite Analostan island. In general appearance they resemble young shiners (*Luxilus americanus*), for which they might easily be taken by superficial observers. Upon a closer examination, however, the generic features, as pointed out elsewhere, become so obvious, that when once observed, they can never fail to attract attention. The body is elongated and subfusiform in profile; the peduncle of the tail being stoutish. The head enters four times and a half in the total length. The eye is of moderate development and circular in shape; its diameter entering about four times in the length of the side of the head. The snout is subconical, and the fact of its projecting beyond the lower jaw is a trait partaken more or less by all the species of this genus; the gape of the mouth is directed somewhat obliquely upwards; the posterior extremity of the maxillar bone corresponds to a vertical line drawn between the nostrils and the anterior rim of the orbit. The dorsal fin is rather elevated, superiorly rounded off; its anterior margin is equidistant between the apex of the snout and the last scales at the base of the caudal fin. The origin of the ventral fins takes place somewhat anteriorly to the dorsal. The anal fin is deeper than long. The ventrals are broader and shorter than the pectorals. The scales are larger than those of the shiner (*Luxilus americanus*) and the lateral line, though deflexed, is much less so than in the fish just alluded to. The color is uniformly silvery; greyish olive along the dorsal region, and of a metallic reflect over the rest of the body and sides of the head. The fins are unicolor, except the dorsal which exhibits a black spot at its posterior margin.

The species referred to in this paragraph resembles *C. whipplii* most, with this chief difference, that the dorsal fin is less elevated, and the ventral fins situated somewhat more anteriorly. The minor differences will suggest themselves upon the comparison of their respective diagnosis. We think that the name of *C. analostana* may, with great propriety, be bestowed upon it.

VIII. Our friend, Townend Glover, has just brought us from Palatka, East Florida, a Cyprinodont, of the genus *Fundulus*. The specimen is unique, and belongs to the male sex. Compared to *F. grandis*, of which it has the length, the body is more slender, and subfusiform in general appearance. The greatest depth, taken at the origin of the ventral fins, is equal to the length of the head, which enters four times and one third in the total length. The scales which cover the upper surface of the head and the opercular apparatus, are of moderate development. The head is subpyramidal, the snout tapering, and the mouth rather small. The eye is subcircular, of medium size; its diameter entering about four times and a half in the length of the side of the head. The dorsal fin is longer than high; it is higher posteriorly than anteriorly, and its origin is nearer the apex of the snout than the extremity of the caudal fin. The latter is subtruncated or subconvex, and constitutes nearly the sixth of the total length. The anal is deeper than its base is long, subtriangular towards its extremity which projects further back than the dorsal. The ventrals are broad and short, not extending quite to the vent, which is situated near the anterior margin of the anal fin. The pectoral fins are likewise broad and short, although much more developed than the ventrals; their posterior extremity is nearly even with a vertical line drawn at the origin of the latter fins. The rays stand as follows:—D 17; A 13+1; C 5, 1, 8, 7, 1, 5; V 6; P 17.—The scales are much deeper than long, anteriorly truncated and rounded upon the rest of the periphery. Radiating furrows are observed upon their anterior section only. The ground color is yellowish brown, quite dark along the dorsal region, spotted with black; whitish and unicolor beneath. The spots corresponding to the scales, upon the line of their intersection. The dorsal and caudal fins are likewise spotted, and assume a reticulated appearance. The anal and the ventrals being yellowish and unicolor, the edge of the anal alone is blackish, whilst the pectorals are greyish olive.

The throat and inferior surface of the head exhibit the same tint as the abdomen. The sides of the head are yellowish brown, whilst its upper surface is rather dark and blackish. Finding no species on record with which the present one can be identified, the name of *Fundulus seminolis* may not be deemed inappropriate to designate it henceforward.

IX. The fish which we have formerly described (Proc. Acad. Nat. Sci., Philada. vi. 1853, 389), under the name of *Fundulus tenellus*, from specimens obtained at Prairie Mer Rouge, La., and Russellville, Ky., belongs to the genus *Zygonectes*, proposed by Professor Agassiz (Amer. Journ. of Sci. and Arts, second series, xvi. 1853, 135), so that its present systematic name will be *Z. tenellus*. We should not be surprised at all to hear that the latter is identical with either one or the other of the sundry species of that genus, which Professor Agassiz has named without characterizing (Amer. Journ. of Sci. and Arts, second series, xvii. 1854, 353), except by alluding to their coloration. The characters of the genus itself, were never defined, so that ere long, we may expect to encounter as much difficulty in identifying its species, as we meet with those recorded in the "Ichthyologia Ohiensis."

X. The party under Lieut. J. C. Ives, has brought home a very remarkable species of *Hydrargyra*, which was collected "between Fort Defiance and Fort Union, New Mexico." It is probable, therefore, that it was caught in one of the upper affluents of the Rio Grande del Norte (Rio Bravo).

The average size of the specimens now before us is about three inches, in males as well as in females. The sexual differences reside, as usual in this genus, in the dorsal and anal fins, which are more developed in the male than in the female. The body is elongated, compressed, and subfusiform in profile; the back being slightly arched. The head is subpyramidal, very much depressed above, entering about four times and a half in the total length, and apparently somewhat smaller in proportion in the female than in the male. The eye is subelliptical; its longitudinal diameter being contained four times, or a little more, in the length of the side of the head. The dorsal fin is longer than high; its base entering six times and a half in the total length; its origin, in the male, is nearly equidistant between the apex of the snout and the posterior margin of the caudal, whilst in the female it takes place much more posteriorly. The insertion of the anal fin is the same, with reference to the dorsal in either sex, but, since the posterior portion of the dorsal, in the male, is more developed than in the female, the consequence is that it is nearly even with the posterior extremity of the anal, whilst in the female, the latter stretches considerably beyond the extremity of the dorsal. The anal fin itself is as long as deep in the male, and deeper than long, in the female; exteriorly rounded off in either sex. Its anterior margin, in the female, is overlapped by the membranous expansion of the genital foramen. The caudal fin is subtruncated. The ventrals are short and broad; their extremities reaching the anterior margin of the anal in the male, which is not the case in the female. The pectorals are of moderate development, subovate in their outline, approximating by their extremity the insertion of the ventrals in the male, remaining more apart in the female. The numbers of the fins rays are; ♂ D 13; A 14; C 6, 1, 7, 7, 1, 6; V 5; P 17. The scales are comparatively smaller than in *H. similis*, and differ furthermore from those of the latter species in being much deeper than long. They are subquadrangular in shape, and furrowed upon their anterior section alone. The ground color of the upper region of the head and body is olivaceous-brown, with a blackish, small spot upon either scale, giving that region quite a dark appearance: whilst a yellowish tint prevails along the sides and beneath. Transverse, narrow black bars or bands, much more conspicuous in the male than in the female, may be observed from the insertion of the pectorals to the base of the caudal, about sixteen in number, and extending from the dorsal line to the belly. The intervening spaces are somewhat wider than

the bands themselves. The fins are greyish olive, unicolor; the anal and the ventrals, in the female, being oftentimes of a lighter tint.

In allusion to the numerous transverse lateral bars, we shall call this species *Hydrargyra zebra.*

XI. In 1853, (Amer. Journ. of Sci. and Arts, second series, xvi. 135), the genus *Heterandria* was proposed to include two small species of fish inhabiting the fresh water ditches of South Carolina. All that we were told about their generical characters had reference to the anal fin, which in the male sex, is very slender and deep and inserted more anteriorly than in the female. That difference between the sexes suggested the appellation of *Heterandria.* Most genera of the so called Cyprinodonts, however, exhibit similar sexual differences in a greater or lesser degree.

In the same year, 1853, we described four species under the head of *Heterandria,* three of which we have recently* referred to the genus *Gambusia,* and one to the genus *Girardinus,* proposed by Prof. Poey, of Havana, to include sundry Cuban species. The genus *Limia,* of the same author, would likewise fall under the head of *Heterandria,* as indicated. The genera just alluded to of the Cuban naturalist, not only cover the same ground as *Heterandria,* but have priority over the latter.

The following characters may be assigned to the genus *Gambusia.* Mouth protractile, rather cleft and nearly horizontal, the lower jaw projecting somewhat beyond the upper. An external series of rather conical, curved and conspicuous teeth, behind which may be observed a patch of velvet like teeth. The origin of the anal fin is situated in advance of the anterior margin of the dorsal, deeper and differently constructed in the male than in the female. The branchiostegal rays numbering six on either side; the branchial orifices being continuous under the throat. Prof. Poey states that the intestine is short, and the liver large.†

Amongst the fishes recently collected by Mr. T. Glover, at Palatka, East Florida, we find specimens of a species of *Gambusia,* which upon comparison with the specimens of *Heterandria holbrookii,* Ag. (MS.) collected by ourselves in Charleston, S. C., prove to be identical with the latter.

The largest female specimen which has come under our observation, measures two inches in total length, in which the head enters four times and a half, and the caudal fin six and a half times. The head itself is very much depressed and sloping towards the snout, giving the latter a wedge-shaped appearance, a trait not altogether peculiar to the species of this genus, for we observe it in *Pœcilia, Limia, Girardinus,* and to a certain degree in *Fundulus* and *Hydrargyra.* The eye is very large, subcircular; its diameter entering but three times and a half in the length of the side of the head. The body is subfusiform in profile when not otherwise distorted by the presence of ova or embryos in the abdomen. The origin of the dorsal fin is much nearer the extremity of the caudal than the tip of the snout; the fin itself being higher than long. The anal fin is larger than the dorsal, deeper than long, exteriorly subtruncated, its anterior margin being nearly equidistant between the tip of the snout and the extremity of the caudal fin. The ventrals are small, short and broad when expanded; their tips extending as far as the vent when the belly is not otherwise distended. The pectoral fins are rather large, projecting beyond the insertion of the ventrals when in their natural condition. The formula of the fins is as follows : D 8; A 9; C 4, 1, 6, 6, 1, 5; V 6; P 1, 10.—

The largest male specimen which we have examined, measures about an inch and a quarter. The body is quite slender, and fusiform in profile, the head holding the same proportions towards the total length as in the female

* U. S. and Mex. Boundary Report, vol ii. Ichthyology, pp. 71 and 73.

† Memorias sobre la Historia Natural de la isla de Cuba, i. 1851, 390.

sex. The origin of the dorsal fin is nearly equidistant between either extremities, whilst that of the anal is equidistant between the apex of the snout and the insertion of the caudal fin. The ventrals hold the same position towards the anal as in the female sex. The pectorals are proportionately longer. The fins exhibit the same number of rays as in the female; the anal differs in its structure, inasmuch as the second and third rays are much stouter and more elongated than the rest.

The scales are well developed, deeper than long, posteriorly rounded off, anteriorly truncated, with radiating furrows upon the latter section alone. The color is uniform olivaceous brown, lighter beneath than above; the dorsal and caudal fins exhibiting transverse blackish lines.

Gambusia holbrooki is very abundant in ponds and ditches of fresh water of South Carolina, and as already stated, was also collected in Florida. Specimens from the latter locality are somewhat larger than those from South Carolina.

XII. The smallest fish so far known to inhabit fresh waters is *Heterandria formosa*, Ag. (MS.), which is found associated with the preceding species, in South Carolina, where we have observed it ourselves, as well as in Florida, whence Mr. Glover has brought specimens. When full grown the female measures about an inch in total length, and the male six-eighths of an inch; the specimens from Florida being somewhat larger than those from South Carolina.

The body is compressed and fusiform in profile; the head constituting a little less than the fourth of the entire length. The snout is very short and rounded off, the mouth quite protractile, with the lower jaw slightly projecting beyond the upper one. The eyes are very large and subcircular; their horizontal diameter entering about twice and a half time or at most thrice in the length of the side of the head. The dorsal fin is higher than long; its anterior margin being nearly equidistant between the apex of the snout and the extremity of the caudal fin. The anal is deeper than long, and somewhat smaller than the dorsal. The ventrals are very small, short and broad, extending as far as the vent. The pectorals are elongated and project beyond the origin of the ventrals. The fins in the male sex resemble those of the female just alluded to, except the anal which is inserted more anteriorly, its second and third rays being much more developed than the rest, thus giving that an appendage-like appearance. The scales are comparatively very large; seven longitudinal series only being observed across the flanks of the female sex. They are deeper than long, and furrowed upon their anterior section alone. The ground color is olivaceous, or else yellowish brown above; the belly being of a light lemon tint. A black streak extends from the snout along the middle of the flanks to the insertion of the caudal fin. From six to eight brownish black vertical streaks may be observed along the sides intersecting the lateral streak, thus subdividing the surface of the body into quadrangular areas. A jet black spot exists at the base of the caudal fin, also at the anterior margin of the dorsal and anal, except in the male sex in which the latter fin is of a uniform yellowish tint. The caudal, ventrals and pectorals are olivaceous and unicolor in either sex.

The species thus briefly described, belongs to the genus *Girardinus* of Prof. Poey. It is characterized by a protractile, rounded, and scarcely cleft mouth, the lower jaw projecting somewhat beyond the upper one. There is but one series of teeth which are approximated, moveable, slender at their base and extremely acute. The anterior margin of the anal is situated somewhat in advance of the dorsal, and varying in structure according to the sexes. The caudal is rounded as usual. The branchiostegal rays are five on either side, and the branchial orifices continuous under the throat. The intestine is slender, elongated, convoluted, and the liver small.*

* Memorias sobre la Historia Natural de la isla de Cuba, i. 1851, 390.

Girardinus formosus, is quite as common in ponds and ditches, as the species treated of in the preceding paragraph, especially about the rice fields and inlets of rivers and brooks. Their great abundance has brought them to the notice of every planter at the South, where these fishes are met with.

XIII. A "blind fish, taken from a well near Bowling Green, Ky.," was recently sent to the Smithsonian Institution by J. E. Younglove, Esq.

In its general appearance and chief structural traits it resembles that which occurs in Mammoth cave, with this curious difference, that the ventral fins are wanting: we will call it *Typhlichthys subterraneus*.

Some years ago a fish (*Chologaster cornutus*) was found in the ditches of the rice fields of South Carolina, in all appearances akin to *Amblyopsis spelæus*, having the same advanced position of the vent, the body being covered with similar scales, but the ventral fins are wanting and the eyes fully developed.*

We have not yet been informed of the nature of the dentition of *Chologaster cornutus*. That of *Typhlichthys subterraneus* is similar to the dentition of *Amblyopsis spelæus*, and consisting of narrow patches of acute and very minute teeth upon the premaxillar bones, the palatines and the lower jaw.

These three genera have for common traits of structure: a body covered by cycloid scales, a dorsal and an anal fin opposed to one another, a rounded off, or sublanceolated caudal fin, the position of the vent anterior to the base of the pectoral fins. The shape of the mouth and the dentition are in all probabilities alike. The generical characters consist: in *Amblyopsis*, the want of eyes and the presence of ventral fins; in *Typhlichthys*, the want of eyes and ventral fins, both, and in *Chologaster*, the presence of eyes and the want of ventral fins.

The propriety of establishing three genera upon characters apparently transitory may be questioned by those who believe in the doctrine of transformations. Were *Chologaster* provided with ventral fins, and to differ from *Amblyopsis* by the presence of well developed eyes alone, the plausibility of a transformation of that organ according to circumstances might seduce many. But then again comes *Typhlichthys*, which holds an intermediate position, perfectly eyeless and deprived also of ventral fins.

The largest specimens which we have seen of *Typhlichthys subterraneus* measure a little over one and a half inch. The head which enters about three times and a half in that length, is depressed, and broader than deep. The mouth is proportionally large and transverse, the lower jaw being somewhat longer than the upper. Minute and acerated teeth may be observed upon the lower jaw, the premaxillar bones, and on the palatines also, disposed upon narrow patches. The eyes exhibit no visible traces of their presence, the orbit being filled up by a muscular tissue. The branchial apertures are separated under the throat by a narrow isthmus, the branchiostegal rays being six in number on either side. The body anterior to the dorsal and anal fins is subcylindrical, whilst it is compressed and tapering posteriorly; its entire profile being subfusiform. The vent is situated in advance of the pectoral fins and close to the branchial isthmus. The height of the dorsal fin is greater than its base; its anterior margin is nearer the extremity of the caudal fin than the apex of the snout. The caudal is rounded off posteriorly or sublanceolated, the central rays being the longest. The anal fin is inserted nearly opposite the dorsal, or else somewhat more posteriorly; it is likewise deeper than long. The ventrals, as alluded to above, are entirely wanting. The pectorals are slender and elongated; their middle rays being the most developed. The number of the rays in the various fins is as follows: D 7; A 8; C 4, 1, 6, 6, 1, 5; V 0; P 11; a formula very similar to that of *Amblyopsis spelæus*. The scales are very small, subimbricated, firmly adhering to the skin without being imbedded in it as in the species just alluded to. They are rather

* Amer. Jour. of Sc. and Arts, Second Series, xvi, 1853, 135.

deeper than long, rounded off, broader anteriorly than posteriorly, exhibiting distant concentric lines of growth and very wide radiating furrows which affect the anterior portion of the scale only. The head is scaleless, but its upper surface as well as its sides, exhibit transverse cutaneous, finely granular ridges. A few of the latter may be observed along the flanks, over the scales, although much less conspicuous than on the head. The color is a uniform dull yellowish white tint.

XIV. The "sun fish," which we have formerly described under the name of *Promotis obesus*,* belongs now to the genus *Bryttus*, as characterized in our Report upon the Fishes of the U. S. P. R. R. Explorations and Surveys. Its systematic name, therefore, will be henceforwards *Bryttus obesus*.

XV. While assorting some of the fishes which the Smithsonian Institution had been receiving during the past years, a specimen of the genus *Megalops* was found in one of the kegs sent from the Tortugas, Garden Key, Fla., by Lieut. H. G. Wright. It belongs to the same species as that which we have formerly described under the name of *M. elongatus*.

It is three feet and three inches long, regularly subfusiform in its profile the head constituting the fifth of the total length. The greatest depth, which is seven inches, corresponds to the anterior portion of the body, nearly midway between the pectoral and the ventral fins. The posterior extremity of the maxillar bone extends considerably beyond a vertical line which would intercept the hind rim of the orbit. The eyes are subcircular, their diameter entering five times in the length of the side of the head.

The anterior or external ray of all the fins is very stout, considerably stouter than the other rays, and usually the longest also. By anterior or external ray is understood that which begins the series of developed rays, and not the rudiments of rays that occur at the anterior or external margin of the fins. The pectoral fins are lanceolated, but their extremity does not extend as far as the origin of the ventrals. The latter are inserted altogether in advance of the dorsal, so that when expanded, their posterior edge, which is linear, will meet a vertical line dropped from the origin of the dorsal. The caudal is deeply furcated and somewhat shorter than the head. The anal is longer than deep, exteriorly concave or crescentic, the posterior rays extending further back than the posterior, very elongated ray, of the dorsal fin. The latter is much higher than long, somewhat concave upon its upper margin. There are ten longitudinal series of scales between the dorsal and the ventral fins. The total number of scales upon a girdle encircling the body in advance of the insertion of the ventrals—being also its greatest depth—is twenty two, ten on either side, and two odd series, a dorsal and an abdominal series. Small scales may be observed upon the anal and caudal fins to near the extremities of their rays. The numbers of the rays in the various fins correspond to those already given; we need but to state that those of the caudal may thus be expressed: C 4, 1, 9, 9, 1, 3, giving twenty developed rays and nine, perhaps more, rudimentary ones.

XVI. The brooks and streams which mingle their waters with that of the Potomac river have furnished us with a representative of the Etheostomid family, of an apparently new generic type, the characters of which may be thus expressed: body subfusiform; head subconical; snout rather blunt, the upper jaw protruding beyond the lower one, thus giving the mouth an inferior position. The latter is of moderate size, its gape nearly horizontal, surrounded with conspicuous lips. Opercular apparatus scaly, cheeks and throat bare. Dorsal fins distinct; first dorsal lower than the second, and longer than high. Anal smaller than the second dorsal. Caudal fin posteriorly truncated or subtruncated. The genus we will call *Arlina*.

* Proc. Bost. Soc. Nat. Hist. v. 1844, 40.

The largest specimens which we have, so far observed, measure about two inches in total length, the body tapering gradually away towards the insertion of the caudal fin. The head, which constitutes the fifth of the entire length, is subconical in general appearance, the snout being declivous and blunt and overhangs the lower jaw. The anterior nostril is nearer the eye than the margin of the upper jaw. The eye, itself, is large and subcircular, approximating the upper surface of the head; its diameter enters nearly four times in the length of the side of the head, twice behind its posterior rim and once in advance of its anterior rim. The posterior extremity of the maxillar bone corresponds to a vertical line drawn at the anterior rim of the orbit. The first dorsal is convex in its outline, it is separated from the second by an appreciable space. The second dorsal, which is higher than the first, is longer than high, its upper margin being subconvex anteriorly and nearly straight posteriorly. The caudal fin constitutes about the fifth of the total length. The anal is longer than deep and nearly of equal depth throughout; the vent, which is placed close to its anterior margin, is opposite the origin of the second dorsal. The insertion of the ventrals takes place in advance of the anterior margin of the first dorsal; they are slender and elongated, but their extremities are far from reaching the vent. The ventrals are well developed, posteriorly rounded, and project somewhat beyong the ventrals, being even with a vertical line drawn at the terminus of the first dorsal fin. The formula of the rays is as follows:—D IX; 14; A 10; C 4, 1, 7, 6, 1, 5; V I 5; P 13.—The ground color is yellowish with a triple series of blackish blotches, one along the back, and one on either side immediately beneath the lateral line, which runs along the sixth series of scales, counted from above. During life, the intervening space between the lateral blotches is of a metallic green as well as the cheeks. A black spot may also be observed upon the opercular apparatus. A vertical black streak beneath the eye, and one on either side of the snout. The dorsals, the caudal and pectorals are transversely barred with black; the anal and pectorals being unicolor.

We propose calling this little fish *Arlina effulgens* in allusion to its bright color during life.

XVII. The Potomac river, in the neighborhood of Washington, has furnished us with another representative of the *Etheostomid* family, of which constitutes likewise a new generic type, related to *Hadropterus* and *Hyostoma*. It differs from *Hadropterus* by the anal fin, which is smaller than the second dorsal, and from *Hyostoma* by the contiguity of the dorsal fins. It is also allied to *Boleosoma*, from which it may be distinguished by a scaly throat and a truncated caudal. The natural characters of this genus, to which we give the name of *Estrella*, may be thus resumed. Body subfusiform and compressed. Head subconical, well developed, rather blunt. Mouth of moderate size, somewhat protractile, with its gape horizontal; lower jaw shorter than the upper. Opercular apparatus, cheeks and throat scaly. First dorsal fin nearly as high as the second and contiguous to it. Anal smaller than the second dorsal. Caudal fin truncated.

The species is not uncommon, the largest specimens which we have observed, measure about three inches and a quarter. The head forms a fifth of the total length. The nape and occipital region constitutes an inclined plane from the orbits to the origin of the first dorsal fin. The eyes are very large, subelliptical in shape; their horizontal diameter entering about three times in the length of the sides of the head; less than once in advance to the anterior rim of the orbit. The posterior extremity of the maxillar bone extending as far as a vertical line drawn in advance of the pupil.

The first dorsal fin is much longer than high, superiorly convex, its membrane being contiguous to the second dorsal. The latter is likewise longer than high, but it is higher anteriorly than posteriorly, thus the upper margin of that fin, which is subconvex or nearly linear, is nevertheless declivous

backwards. The anal fin is longer than deep, convex upon its edge; its anterior margin being placed somewhat behind a vertical line drawn at the anterior margin of the second dorsal, but the same line intersects the vent. The caudal fin, which is a little shorter than the head, is truncated upon its posterior margin. The ventrals are of moderate development compared to the other fin, their middle rays being the longest; these fins assume a spear-shaped appearance in the state of rest. Their extremities are far from reaching the vent. The pectorals, much larger than the ventrals, assume the same shape as the ventrals, under similar circumstances, but when expanded, their posterior margin is quite convex. Their extremities project beyond those of the ventrals, although they do not reach a vertical line intersecting the vent. The rays of the fins are:—D IX; 15+1; A 11; C 10, 1, 7, 7, 1, 9; V 1, 5; P 13.—The scales are of moderate size, deeper than long, anteriorly truncated and posteriorly rounded, exhibiting radiating furrows upon their anterior section, and numerous, slender, needle-like pectinations upon their posterior margin. The lateral line constitutes the seventh series of scales, counted from the second dorsal fin.

The ground color is yellowish brown, the dorsal region being maculated with blackish brown, whilst the ventral region is unicolor. A series of large blotches may be observed along the dorsal line affecting both sides of the back, and a series of smaller blotches along the lateral line. There is also a black streak on either side of the snout, and a vertical one beneath the eye. The caudal and pectorals are transversally barred with black, the dorsals irregularly vermiculated, giving these fins a checkered appearance. The first dorsal is moreover provided with a jet black spot upon its anterior edge, between the first and second rays. The anal and ventrals are blackish, the tint being lighter at the base of these fins than towards their periphery.

The black spot at the anterior margin of the first dorsal fin, has suggested the specific name of *E. atromaculata*, by which we propose to designate this fish.

XVIII. A third, and much larger species of Etheostomid occurs in the waters of the Potomac river. It is identical with the one from the Susquehanna river, described by Prof. Haldeman under the name of *Percina nebulosa*. *

XIX. *Etheostoma caprodes* of Rafinesque, is very closely allied to *Percina nebulosa*, so closely, indeed, that we are not yet prepared to point out the differences with a sufficient degree of accuracy. But whatever it may be *Etheostoma caprodes* must be referred to the genus *Percina* of Haldeman, as having priority over that of *Pileoma* of DeKay. Both of these genera were published in 1842, but since *Percina* is quoted by DeKay,† it evidently shows that it was issued from the press before *Pileoma*. That the genus *Percina*, as first constituted, contained heterogeneous species, is no ground for rejecting it altogether, and the species first enumerated must be considered as its type.

XX. Hence, should *Pileoma semifasciatum* prove specifically distinct from *Percina nebulosa*, it will be the third species of the genus *Percina* under the name of *Percina semifasciata*.

XXI. The *Etheostomid* from Lake Superior, described as *Pileoma zebra*, is to be a fourth species of *Percina* under the appellation of *Percina zebra*.

XXII. Finally a fifth species of the genus *Percina* was described by us in the "Ichthyology of the U. S. and Mexican Boundary Survey," under the name

* Journ. of the Acad. of Nat. Sci. Philada. viii. 1842, 330.

† New York Fauna, Part iv. 1842, 162.

of *Pileoma carbonaria* which is to be designated henceforwards under that of *Percina carbonaria.*

XXIII. We propose now to characterize a new genus of Etheostomid under the name of *Oligocephalus*, as follows: Head small and subconical; mouth terminal, of moderate size, not protractile; jaw equal and provided with slender, acerated and conspicuous teeth, disposed upon multiple series, the external series much larger than the inner series. Opercular apparatus, cheeks and throat scaleless. First dorsal fin lower than the second, longer or nearly of the same length, and contiguous. Anal much smaller than the second dorsal, and provided anteriorly with two small spiny rays. The external ray of the ventral fins is likewise a small spine. Caudal, posteriorly rounded off or else convex. To this genus we now refer *Pœcilichthys lepidus* figured in the Report of the U. S. and Mex. Boundary Commission. The first dorsal is represented as being widely separated from the second, whilst in fact, its membrane reaches the anterior margin of the latter fin. We shall therefore record it in future under the name of *Oligocephalus lepidus.*

XXIV. A species allied to the preceding one, inhabits the hydrographic basin of James river, Va. It reaches nearly the same size, that is about two inches long. Its body is quite compressed, subfusiform in profile, maintaining its depth towards the insertion of the caudal fin. The head enters nearly four times and a half in the total length. The gape of the mouth is slightly oblique; the posterior extremity of the maxillar bone corresponding to a vertical line drawn in advance of the pupil. The diameter of the eye enters about four times in the length of the side of the head. The base of the second dorsal fin is nearly equal to that of the first. The base of the anal fin is nearly equal to its deepest rays. The ventrals are lanceolate in shape; whilst the pectorals are subelliptical in their outline, their extremities projecting beyond those of the ventrals. The formula of the fins is as follow :—D vii; 13; A ii, 7; C 6, 1, 6, 7, 1, 5; V i, 5; P 13.—The scales are rather small, somewhat deeper than long, finely pectinated posteriorly, with radiating furrow at the anterior section only. The lateral line constitutes the eighth series of scales, counted from the second dorsal fin. The ground color is reddish brown, transversely maculated with blackish spots. The second dorsal fin and the caudal are transversely barred with black upon a light olivaceous ground. The first dorsal, the anal, the ventrals, and the pectorals are of a uniform light olive tint. A jet black spot may be observed immediately above the insertion of the pectorals close to the thoracic arch, and has suggested the name of *Oligocephalus humeralis*, by which we propose to designate this species.

XXV. The species from Walcott, Wayne Co.. N. Y. described by my friend, Dr. H. R. Storer, under the name of *Etheostoma linsleyi*,* belongs to the genus *Oligocephalus*, as characterized above. I have in my possession authentic specimens of the same. It is a much slenderer fish than the two foregoing species, and like *O. humeralis*, is provided with a black spot above the pectoral fins, close to the thoracic belt. A careful description of it having been given by its author, we need simply refer to it for the present. We have recorded it under the appellation of *Oligocephalus linslii*, in the monograph we prepare upon that family of our fresh water fishes.

XXVI. Amongst the fishes collected by Major B. Alvord, at Fort Gratiot, Lake Huron, there is a species of Etheostomid, the generic characters of which remind us somewhat of those given to the genus *Hadropterus.* The opercle and cheeks, however, are scaleless, as well as the throat, which is minutely prickly. The first dorsal fin is longer and lower than the second, which is equal to the

* Proc. Bost. Soc. Nat. Hist., iv. 1851, 37.

brevi cinerea sericans, capite thoraceque saepe rufo-testaceis, hoc latitudine plus sesqui breviore, lateribus rotundatis marginatis, antennis pedibusque testaceis, illis articulo 9no præcedente vix majore. Long. ·07—·09.

Fort Tejon. Varies much in size and color, being sometimes fuscous, sometimes entirely pale testaceous: the usual variety has dark elytra and pale head and thorax. It differs from the types of the genus in having the antennæ very slightly thickened from the 3rd to the 9th joint, the 10th and 11th are thicker and longer than the 9th; the latter in the male is about twice the size of the 8th, in the female but little larger. The effect of this is to cause the antennæ to be only moderately clavate, instead of capitulate. This taken in connection with the more dense pubescence and punctuation, and less convex body would seem to indicate the propriety of separating this as a distinct genus, but before a general study is made of our species of the family of Nitidulidæ the attempt to define it would be premature. As in other species of the genus, the antennal grooves are entirely wanting.

22. Carpophilus pallipennis (*floralis* Er.). Found also in the Rio Grande valley.

23. Carpophilus caudalis, elongatus, depressus, piceus nitidus, subtiliter pubescens, thorace brevi, lateribus rotundatis marginatis, sat dense punctato, elytris thorace duplo longioribus, fortius marginatis, punctulatis, macula magna rubro-testacea triangulari utrinque ornatis, pedibus antennisque rufis, his clava infuscata; abdomine segmentis tribus detectis, quarto sequente paulo longiore. Long. ·15.

Two females; one from Tejon, the other from Nebraska. Precisely resembles in color and sculpture C. discoideus Lec., (Proc. Acad. 1858, 62), but differs by the abdomen being much longer, and having three segments exposed. The latter was, however, described from a single male, and future examination may show that they are sexes of one species.

24. Nitidula humeralis, longiuscula, subconvexa, fusca, pubescens, thorace latitudine duplo breviore, lateribus late rotundatis, ciliatis, elytris nigricantibus, margine apicali et laterali angusto, strigisque tribus basalibus pallidis, intermedia longiore, antennis basi pedibusque pallidioribus.—Long. ·16.

One specimen, Tejon. Related to N. ziczac, but is longer and more convex with the sides of the thorax less rounded, and with no medial angulated spot on the elytra: the three spots at the base are connected, and there is besides a slight submarginal spot near the middle. As in that species the middle and posterior tarsi are very feebly dilated.

25. Temnochila chlorodia.

26. Hister sexstriatus *Lec.* Found also at San Francisco.

27. Hister remotus, oblongus niger nitidus, parum convexus, thorace stria marginali a margine remota, subsinuata, disco intra striam punctis paucis notato, elytris striis internis duabus pone medium antice abbreviata, tertia parum abbreviatis, tribus externis marginalique integris, epipleuris bistriatis, tibiis anticis serrulatis. Long. ·23.

One specimen, Tejon. Belongs to div. 9 of my arrangement, Proc. Acad. Nat. Sc. 6, 38, although very distinct from all the others found in the United States. It seems most nearly related to the European H. neglectus, and with it belongs to Mr. de Marseul's 6th group.

28. Hetaerius morsus, piceo-rufus oblongus, thorace punctato subnitido, sulco obliquo utrinque insculpto, partibus lateralibus incrassatis valde elevatis planis, opacis dense puberulis, lateribus ante medium angulatis, ante basin profunde incisis; elytris pube erecta parce vestitis, punctatis subnitidis, striis externis tribus integris; prosterno compresso, postice paulo dilatato, mesosterno plano. Long. ·14.

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One specimen, Tejon. In this the most remarkable, as well as the largest species of the genus, the front is slightly concave, with a raised margin, and the tibiæ are suddenly dilated and denticulate as in the others. The sides of the thorax are parallel from the base nearly to the apex, where they are suddenly obtusely angulated, and run to the anterior angles which are rounded: the incision near the base cuts across the incrassated side, leaving the posterior part a small quadrate elevated plate, the anterior portion larger, subtriangular with truncate angles, flat, opaque and densely pubescent.

29. Saprinus lugens. 30. S. oregonensis. 31. S. lubricus.

32. Brontes truncatus.

33. Dermestes marmoratus. 34. D. Mannerheimii.

35. Attagenus rufipennis, elongatus, niger, pubescens, thorace latitudine duplo breviore, paulo convexo, confertim minus subtiliter punctato, elytris parcius punctatis, rufo-testaceis, tarsis rufo-piceis. Long. ·12.

One female, Tejon. A small species, differing from the others in my collection by the more coarse and dense punctuation of the thorax: the head is punctured like the thorax and the antennæ are entirely black.

36. Anthrenus lepidus.

37. Serica fimbriata.

38. Hoplia callipyge. This may be a favorable opportunity to observe that recent observation has shown that H. tristis *Mels.* is the male of H. trifasciata *Say* (*primoria* Burm.), a fact that could never have been inferred from the appearance of the two supposed species.

39. Pleocoma fimbriata. Some fragments of this insect, found in the stomach of a woodpecker at Tejon, enable me to investigate the oral organs.

The clypeus at its inferior margin is emarginate for the insertion of a pyramidal hairy corneous labrum: the mandibles are short, pyramidal acute, with a few hairs near the apex. The maxillæ are large at the base, with the lobes very small, the outer one not reaching beyond the first joint of the palpi, penicillate with long hair, the inner one much smaller, narrow and pointed; palpi slender, first joint short, 2d long, 3d one-half shorter than 2d, 4th a little longer than 3d. Mentum broadly rounded in front; ligula almost semicircular, palpi inserted on the upper face of the ligula, bases contiguous, with intermediate pencil of hairs, 3d joint longer than 2d, and the latter longer than the first. It will thus be seen that combined with the 11-jointed antennæ with polyphyllous club, the characters above detailed are abundantly sufficient to establish this genus as a new group, related to Geotrupidæ and Copridæ, with, however, strong tendency towards the Dynastide group of Scarab. pleurosticti.

40. Canthon simplex.

41. Anthaxia strigata, lata depressa, nigro-ænea, sæpe cyaneo-variegata, thorace latitudine fere duplo breviore, lateribus rotundatis, angulis posticis subrectis, fortius reticulatim punctato, utrinque pone medium oblique impresso, elytris thorace haud latioribus, confertim fortius granulatis, fortius marginatis, parallelis, postice suboblique attenuatis et rotundatis. Long. ·17—·25.

Tejon, abundant. Front moderately concave, hairy: the sides of the thorax are less rounded than in A. expansa, the punctures are strongly marked, and there are besides fine elevated lines, having a general longitudinal direction, connected together forming elongate meshes. In some specimens the disc of the thorax is darker than the sides. It is, perhaps, A. æneogaster *Lap.* and *Gory*; the description given by them contains no definite character by which to separate it from allied species.

42. Acmæodera connexa nigro-ænea, cuneiformis pilis longis erectis parce

vestita, thorace latitudine triplo breviore rude punctato, lateribus rotundatis, postice incurvis, medio late excavato, postice utrinque late impresso, elytris thorace angustioribus humeris elevatis; usque ad trientem secundum paulo, dein magis angustatis et fortiter serratis, striis punctis quadratis fortiter impressis, interstitiis parce subtiliter punctatis, maculis flavis pluribus ante medium varie conjunctis, alterisque duabus fasciformibus pone medium fere ad suturam extensis, apice sæpe gutta flava notato. Long. ·33—·47.

Tejon, numerous. Allied to A. ornata, but is narrower, and has the punctures of the intervals of the elytra much smaller. The spots are also different, the anterior ones forming a reticulated mass, more or less broken, extending from the base to beyond the middle, and from the margin two-thirds way to the suture. It is also allied to A. opacula *Lec.*, but the sides of the thorax are not yellow, the elytra are less gradually attenuated at tip, and the spots are different.

43. Acmæodera retifer, nigro-ænea, subparallela, pilis longis erectis parce vestita, thorace latitudine triplo breviore, punctato, lateribus rotundatis, medio late canaliculato, postice versus angulos oblique profunde impresso, elytris thorace haud angustioribus, ad trientem secundum vix angustatis, dein rotundatim attenuatis, fortiter serratis, striis fortiter punctatis, interstitiis parce subtiliter punctatis, maculis flavis varie connexis vittam reticulatam fere ad apicem extensam utrinque formantibus. Long. ·34.

One specimen, Tejon. Allied by sculpture and marking to the preceding, but differs by the thorax not being wider than the elytra, by its sides not being suddenly incurved behind, and by the elytra being hardly attenuated from the base to the second third, and finally by the reticulated mass of small spots forming broad vitta extending nearly to the apex.

44. Acmæodera guttifer, subcylindrica æneo-nigra, parce longe albo-pilosa, thorace latitudine duplo breviore, convexo, lateribus rotundatis, apice transversim impresso, basi medio profunde foveato et late excavato, fortiter punctato, elytris postice obtuse rotundatis, punctis quadratis seriatis, interstitiis subtiliter uniseriatim punctulatis, striis externis exaratis, guttis flavis ornatis, 3 discoidalibus, 5 submarginalibus. Long. ·28.

Tejon. Resembles the small common species of the Atlantic States, but is abundantly distinct; the anterior discoidal spot is on the 5th and 6th spaces at the middle, the 2d on 4th and 5th at one-fourth from the apex, the 3d on the 3d and 4th half way between the second and the tip: the humeri are elevated.

45. Limonius hispidus.

46. Dolopius subustus. A variety of this species having the suture broadly fuscous and the margin of the elytra behind the middle also darkened.

47. Sericosomus debilis, luteo testaceus, elongatus breviter pubescens, thorace latitudine fere duplo longiore, lateribus late rotundatis, antrorsum vix angustiore, angulis posticis subcarinatis haud divaricatis, dense punctato, obsolete canaliculato, elytris striis punctatis, interstitiis subconvexis confertim punctulatis. Long. ·29.

One specimen Tejon. Closely related to S. silaceus (*El. silaceus* Say,) and differs essentially only by the posterior angles of the thorax not diverging, but continuing the outline of the sides of the thorax.

48. Elater cordifer, niger, breviter pubescens, thorace opaco, confertissime punctato, latitudine paulo longiore, antrorsum sensim angustato, lateribus rotundatis, elytris læte auruntiacis, macula communi nigra apicali cordiformi signatis, striis punctatis, interstitiis planis rugose punctulatis, antennis articulis 2ndo et 3io conjunctis 4to vix longioribus; tarsis fuscis. Long. ·41.

One specimen, Tejon: another from Sacramento Valley given me by Mr. S. S. Rathron. Resembles in appearance E. apicatus, but the color of the elytra is much more vivid, the intervals between the striæ are flat, the thorax is much more densely punctured and without lustre. The hair on the head and thorax is entirely black, on the elytra it is yellowish.

49. Melanactes densus.

50. Cardiophorus fulvipes, plumbeo-niger, nitidus pube brevissima incanus, thorace latitudine haud longiore, convexo, lateribus valde rotundatis, dense subtilissime punctulato, obsolete canaliculato, angulis posticis haud divaricatis, elytris subtilissime punctulatis, striis punctatis, interstitiis convexis, pedibus fulvo-testaceis. Long. ·36.

One specimen, Tejon. Related to C. tenebrosus, but with the feet red, and the thorax more rounded on the sides. Belongs to the division with tarsi and ungues simple.

APLASTUS.

Frons paulo concava, antice sensim deflexa, medio haud marginata: oculi convexi; labrum breve antice rotundatum, clypeo arcte affixum; mandibulæ modice elongatæ, acutæ, medio obtuse dentatæ: palpi articulo ultimo non longiore subcylindrico: antennæ (maris) elongatæ, 11-articulatæ, articulo 1mo crassiore, sequentibus duobus breviore, 3io 2ndo sesqui longiore, haud dilatato, 4to triangulari, 3io sesqui longiore; 5—10, 4to æqualibus, 11 longiore apice acuminato. Prosternum antice late rotundatum, sutura laterali recta, postice mucronatum: coxæ anticæ parvæ, mediæ contiguæ, posticæ laminis intus subsubito latioribus truncatis: tarsi longiusculi, pubescentes, articulis 1—4 sensim brevioribus, 5to præcedente longiore, unguiculis integris: tibiæ tenues, calcaribus parvis; abdomen 5-articulatum.

Has the appearance of an elongate Corymbites, (e. g. C. appressifrons) but is closely allied to Plastocerus and Euthysanius, from which it differs essentially only by the antennæ being elongate and serrate.

51. Aplastus speratus, nigro-fuscus, pube cinerea vestitus, thorace latitudine fere sesqui longiore, antrorsum sensim angustato, lateribus rectis, angulis posticis elongatis valde divaricatis, punctato, postice obsolete canaliculato, elytris striis distinctis, interstitiis punctatis subconvexis. Long. ·66.

Several specimens from Tejon. The antennæ extend considerably beyond the base of the thorax, and being of the same length, or nearly so, in all the specimens, I infer that they are all males.

This genus most perfectly completes the line of genera from the aberrant Elaters like Campylus, through Plastocerus and Euthysanius to Cebrio. This resembles the Elaters, and Euthysanius the Cebrios. An interesting fact, though not without parallel in other families and classes of animals, is that these transition forms should all occur in one Zoological region.

52. Plastocerus frater. Under this name I would characterize a species very closely related in form and sculpture to P. Schaumii, but differing by the thorax being broader and considerably rounded on the sides. The female is of the same form as the male, but with the elytra slightly narrowed towards the tip; the wings are perfect. The antennæ of the female are short and serrate. The specimens are in the collection of Mr. Henry Ulke, and I have not access to them at this present moment, but will on a future occasion make a full description of them. I will add, in passing, that the sexual characters given by me (Trans. Am. Phil. Soc. 10, 502,) are erroneously founded.

53. Euthysanius lautus. Several males and one female were procured at Tejon. The latter is one of the most remarkable forms yet found and indicates the close relation between this genus and the Cebrionidæ. The head and

thorax are as in the male: the antennæ are longer than the head, 12-jointed, the inner angle of the 6th and 7th slightly prominent, of the 8th—11th joints gradually more prolonged into a short ramus: the ramus of the 11th almost equal to the 12th joint. Elytra covering only the first segment of the abdomen, diverging at the suture behind, and obliquely truncated with the outer angle broadly rounded. Abdomen very long, cylindrical, with seven ventral segments and a large anal plate, first segment very short. Feet entirely as in the male. Length, 1·45.

54. Podabrus pruinosus.

55. Podabrus Tejonicus, supra pallidus, capite dense subtiliter punctato, pone oculos nigro, thorace punctulato latitudine paulo longiore, lateribus rectis, utrinque longitudinaliter late excavato, disco postice late excavato callis duobus notato, elytris subtilius scabro-punctatis; subtus piceus, antennarum basi, pedibusque pallidis femoribus posterioribus basi nigris. Long. ·30.

One specimen, Tejon. At first view, resembles P. cavicollis *Lec.*, from San Diego, but the head is more finely punctured, the thorax is comparatively wider, finely punctulate, not deeply excavated in the middle for its whole length, as in that species, and the elytra are more finely punctured: the anterior angles of the thorax are rounded, while in P. cavicollis, they are obliquely and broadly truncate. The ungues as in that species are broadly toothed at the base.

TANAOPS, (fam. Melyridæ.)

Antennæ frontales, in foveis insertæ: 11-articulatæ, serratæ; palpi maxillares articulo ultimo longiore acuto: labrum antice rotundatum, clypeus brevis membraneus: tarsi simplices antici 5-articulati, maris articulis duobus paulo latioribus: abdomen segmentis ventralibus anticis medio membraneis: caput elongatum.

A genus composed of Malachius longiceps Lec., (Proc. Acad. Nat. Sc. 6, 165,) and the one described below. It differs remarkably from the other genera, by the antennæ being frontal, inserted before the eyes, but not near the clypeal suture, which from the length of the head is thus much farther from the eyes than usual. The clypeus is membranous at apex, corneous at base in the type, but in the other is entirely membranous. This would seem to indicate that they were to be regarded as of different genera, but the form, sculpture and coloration, as well as the length of head and position of antennæ are so perfectly similar in both species, that it would be very unnatural to separate them. Regarding the genus as the transition form from Malachius with frontal antennæ and corneous clypeus to Anthocomus with the antennæ lateral and clypeus membranous, it will be clear that the clypeus might be variable in structure, provided other characters be impressed sufficient to distinguish the group as of generic value. We will then have two groups: 1. T. longiceps, with the clypeus partly corneous and the abdomen simple. 2. T. abdominalis, with the clypeus entirely membranous and the last three segments of the abdomen with deep reniform excavations, the last one having in addition a small cup like medial fovea.

56. T. abdominalis, niger nitidus, parce nigro-pilosellus, capite elongato, thorace lateribus late coccineis, elytris punctulatis limbo laterali, sutura fere ad basin, apiceque coccineis, subtus rufus, antennis pedibus postpectoreque nigris, abdominis segmentis tribus ultimis profunde excavatis. Long. ·15.

Tejon, one specimen. The pygidium is black, the segment before it is black in the middle, rufous at the sides. Other specimens will be required to determine whether the curious excavations of the abdomen are sexual or specific in value.

HAPALORHINUS.

Antennæ frontales, in foveis majusculis insertæ, 11-articulatæ, pectinatæ, vel serratæ; palpi maxillares articulo ultimo longiore acuto: labrum trans-

versum truncatum; clypeus brevis membraneus; tarsi antici 5-articulati, maris haud dilatati: abdomen articulis totis corneis, vel medio membraneis: caput breve.

A genus also intermediate between Malachius and Anthocomus, agreeing with the first in the position of the antennæ, with the second by the membranous clypeus. Besides the species here described, I refer to this genus Malachius auritus Lec., (Proc. Acad. Nat. Sc. 6, 165,) which differs by the antennæ being serrate in both sexes and by the ventral segments of the abdomen being corneous. In the species here made known, all the segments except the last have a wide medial membranous portion.

57. H. mirandus, elongatus, parallelus, capite viridiæneo, subtilissime punctulato et pubescente, thorace latitudine breviore, flavo, macula magna nigra a basi fere ad apicem extensa, elytris opacis rugosis flavis, sutura anguste nigra, scutello nigro; subtus niger, genubus anterioribus, pedibusque posticis plus minus flavis. Long. ·15.

Mas antennis pectinatis, elytris flavis, apice contortis, biappendiculatis; margine summo nigricante, femoribus tibiisque posticis flavis.

Femina antennis serratis, elytris flavis, fascia latissima e plagis tribus confluentibus composita nigro-virescente, pedibus posticis nigris, genubus testaceis.

Tejon. The colors of the two sexes are so different, as to lead to error. In the male the elytra are yellow, impressed and distorted at the apex, with a small cylindrical black sutural prominence, and a wide concave external one, which is margined with black: the posterior thighs and tibiæ are yellow, the former with the upper margin black. In the female there is a long common sutural spot confluent each side with one extending nearly the whole length of the margin, forming a very wide band of a greenish color, and the posterior legs are black, with only the knees and apex of the tibiæ yellow. The penis of the male is prominent forming a long cylindrical corneous style.

58. Byturus grisescens.

59. Dasytes sordidus. 60. D. squalidus. 61. D. constrictus. 62. D. luteipes.

63. Dasytes quadricollis, oblongus nigro-æneus, pilis nigris erectis dense vestitus, subtiliter cinereo-pubescens, thorace latitudine breviore, parce subtiliter punctulato, lateribus vix rotundatis, angulis posticis rectis subprominulis, elytris dense subtilius punctatis. Long. ·17.

Tejon. Related to D. conformis and sordidus, but differs from both by the sides of the thorax being scarcely rounded, with the posterior angles very distinct.

64. D. sculptilis, elongatus, parum convexus, thorace latitudine breviore, lateribus late rotundatis angulis anticis acutis, posticis prominulis, alutaceo, præcipue ad latera parce punctulato, linea laterali a margine remota basin ambiente insculpto, elytris alutaceis rugose punctulatis, fortiter marginatis, ad apicem anguste flavis, ano antennis pedibusque rufis, femoribus posticis apice infuscatis: unguiculis internis appendice longa instructis, externis ad basin late dentatis. Long. ·15.

One specimen, Tejon. A very extraordinary species having very much the appearance of a small Trogosita; the last three joints of the antennæ are a little broader than the preceding. The peculiar sculpture of the thorax, a lateral line remote from the margin, and bending around close to the basal margin, is also found in D. constrictus, but was not previously observed by me on account of the somewhat bad condition of the specimens. It is quite obvious in those collected at Tejon; in that species, however, the tarsi are both furnished with a large appendage as usual.

65. Rhadalus testaceus. The original of this species, together with

many other uniques of my collection was lost in a vessel, while being sent to Prof. Lacordaire for examination. A mutilated specimen was brought by Mr. Schott from the Mexican boundary, but the arrival of a fine specimen from Tejon, enables me to study anew the characters, by the aid of Prof. Lacordaire's fourth volume.

The tarsi are not lobed beneath as formerly described by me: the appearance was produced by the agglutination of hairs. From the absence of lobes, the presence of large appendages to the claws, and the size and obliquity of the middle coxæ, the genus must be referred to the same family with Dasytes, though remarkably different from any other described. The eyes are rounded, prominent and coarsely granulate: the last joint of the long maxillary palpi is large and securiform, of the labial palpi triangular; the posterior tarsi have the first and second joints about equal, the third very slightly shorter, the fourth still shorter. The sixth segment of the abdomen in one specimen is exserted, in the other retracted, so as to be very small. The posterior coxæ appear precisely as in the Cleridæ: so that this anomalous genus must be regarded as intimately connecting Dasytes with that family.

66. Cymatodera ovipennis, fusco-castanea, pilis pallidis parce vestita, capite confertissime, thorace subtilius dense punctato, latitudine duplo longiore, ante medium parum, pone medium fortius constricto, medio transversim rugoso, pone apicem transversim impresso, elytris ad basin thorace vix latioribus, postice sensim dilatatis, subtiliter punctulatis, striis punctatis, apicem haud attingentibus, internis brevioribus, fascia transversa pallida ad medium ornatis, antennis pedibusque pallidioribus, illis apice palpisque flavo-testaceis. Long. ·40—·45.

Tejon, two specimens. Resembles in form C. angustata *Spin.*, but is much larger, the thorax is less densely punctured, and the striæ of the elytra are abbreviated, the internal ones ceasing at the pale band.

67. Trichodes tenellus.

68. Clerus eximius.

69. Necrobia ruflpes.

70. Ptinus verticalis, nigro-piceus, elongatus, pube sordide ochracea squamiformi dense vestitus, capite inter oculos transversim impresso, thorace latitudine longiore, postice angustato et profunde constricto, medio sulcato, ad medium dentibus 4 transversim positis e setis erectis formatis armato; elytris latitudine fere duplo longioribus, convexis lateribus rotundatis, seriatim punctatis et longe pilosis; antennis pedibusque testaceis. Long. ·17.

One female, Tejon. Has the dimensions of the female of P. fur, but differs very much in its characters.

71. Sinoxylon declive.

72. Exops Stoutii Lec. *Allæocnemis Stoutii* Lec. 73. E. ovipennis.

74. Lyctus planicollis.

75. Edrotes ventricosus.

76. Nyctoporis carinata.

77. Pelecyphorus costipennis, elongatus, ater, subopacus, thorace convexo, latitudine breviore, lateribus valde rotundatis, depresso-marginatis, rugosis, angulis posticis perobtusis, disco æqualiter sat dense punctato, elytris thorace angustioribus, sutura, margine, costisque utrinque tribus valde elevatis. Long. ·63—·80.

Tejon. The first and second costæ unite about one-sixth from the apex, the third commences at the margin about one-fourth from the base, and ceases opposite the confluence of the other two costæ. The apex of the elytra is strongly margined. The antennæ are moderately short, hardly attaining the middle of the thorax: the head is punctured like the thorax: the apical angle

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of the anterior tibiæ is prolonged. A variety occurs, in which the third costa is entirely wanting, and the first and second have the same origin at the base.

78. Nosoderma diabolicum.

79. Nosoderma pustulosum, sordidum, thorace obovato, latitudine longiore, angulis anticis rotundatis, posticis obtusis, dorso medio deplanato, lateribus late foveatis, tuberculis parvis subnitidis parcis, præcipue ad marginem et in medio positis, elytris intra humeros subexcavatis, medio deplanatis, ante apicem subretusis, tuberculis confertis subnitidis undique obsitis. Long. ·92.

One specimen, Tejon. Of the size and form of N. diabolicum, but the tubercles are smaller, and less irregular, the base of the elytra is not excavated near the scutellum, and there are no velvety spots on the thorax and elytra.

80. Nosoderma plicatum, elongatum, nigro-sordidum, thorace obovato, latitudine longiore, angulis anticis rotundatis, posticis obtusis, subinæquali, medio granulis parcis nitidis, ad latera tuberculis parvis signato, elytris parallelis ante apicem triverrucosis, præcipue ad latera et apicem tuberculatis, costula humerali alteraque pone medium obliquis munitis. Long. ·61.

Tejon, three specimens: very different from any other seen by me. The basal costa commences at the humerus, runs slightly inwards, and terminates at the middle: another oblique fold commences near the margin a little before the middle, runs parallel with the first, and ends about the third fifth; the inner anterior tuberosity is also a little prolonged in the same direction. There is a slight vestige of a costa at the base, parallel with the suture and about midway between it and the humeral costa. The antennal cavities are not so abrupt as in N. diabolicum.

81. Eleodes dentipes. 82. E. laticollis. 83. E. quadricollis.
84. E. consobrina. 85. E. Veseyi. 86. E. scabrosa.

87. Eleodes scabripennis, atra, ovata, subnitida, thorace latitudine paulo breviore, subquadrato, lateribus rotundatis, postice sensim paulo angustato, angulis posticis obtusis, dense punctato, ad latera subasperato, elytris ovalibus, thorace latioribus, dorso parum convexis, postice valde declivibus, granulis parvis inordinatis dense exasperatis, et versus suturam punctatis, tibiis muticis, prosterno postice oblique submucronato, antennis extrorsum parum incrassatis. Long. ·65.

One specimen, Tejon. Of the same size and sculpture as E. Veseyi, but differing by the thorax being much less rounded on the sides, by the posterior angles not being at all prominent, and by the prosternum being a little more prominent behind.

88. Amphidora osculans. 89. A. littoralis.

90. Helops rugulosus.

91. Helops angustus, elongatus, æneo-niger, subnitidus, thorace latitudine haud breviore, vix convexo, lateribus rotundatis, angulis posticis subrectis, capite dense aciculato-punctato, elytris thorace paulo latioribus, striis profundis antice subpunctatis, interstitiis parce subtiliter punctulatis, antennis pedibusque rufo-piceis, palpis tarsisque piceo-rufis. Long. ·31—·36.

Tejon, two specimens. Quite distinct from all others known to me by the above characters.

92. Coniontis viatica.

93. Coniontis abdominalis, ovalis, subcylindrica, convexa, nigra, subnitida, thorace lateribus minus subtiliter marginatis, medio parce, lateribus densius subtiliter punctato, elytris rugosis, sat dense punctatis, abdomine confertim rugose punctato. Long. ·66.

Larger and stouter than either C. viatica, affinis or Eschscholtzii, having the sculpture very like C. affinis, but with the elytra more finely punctured: in all of those however the abdomen is very sparsely and finely punctulate, while in this it is entirely covered with a coarse, somewhat rugous punctuation.

94. Blapstinus brevicollis. 95. B. pulverulentus.

96. Eulabis rufipes.

97. Eulabis brevicornis, elongatus, nigro-piceus, capite confertim, thorace confertim minus subtiliter punctatis, hoc latitudine breviore, minus convexo, lateribus rotundatis, postice subsinuatis angulis posticis rectis, elytris subtiliter costatis, interstitiis uniseriatim punctulatis, antennis pedibusque piceis, illis capite paulo longioribus. Long. ·25.

Narrower and less convex than Eu. rufipes, with the antennæ shorter and stouter.

98. Tenebrio molitor.

99. Cœlocnemis obesa.

100. Platydema oregonense.

101. Xystropus opacus, elongatus, niger opacus, thorace semicirculari, basi bisinuato, confertissime subtiliter punctato, elytris thorace haud latioribus, striis punctatis interstitiis vix convexis, sutura anguste rufescente. Long. ·35.

One specimen, Tejon. Related to X. brevis (*Cistela brevis* Say) but much narrower, and with the antennæ and feet entirely black.

102. Cistela sericea.

103. Prionychus cyanescens, elongatus niger, thorace elytrisque obscure cyaneis opacis, capite thoraceque confertissime punctatis, hoc subquadrato, lateribus paulo rotundatis, elytris thorace paulo latioribus, striis punctatis, interstitiis paulo convexis, alutaceis. Long. ·31.

One specimen, Tejon. Of the same size and form as P. gracilis (*Stenochia gracilis* Lec.) from San Diego, but differs by the blue color of the thorax and elytra, and the entirely black feet.

104. Allecula punctulata, elongato-ovalis, fusca, pubescens, thorace latitudine plus duplo breviore, semicirculari, confertim subtiliter punctato, basi utrinque subimpresso, elytris confertim subtiliter punctatis, striis internis distinctis, externis vagis, antennarum basi, tibiis tarsisque pallidioribus. Long. ·28.

Tejon, one specimen. Differs from several species from the Atlantic States by the thorax being more finely and densely punctured.

105. Anaspis atra.

106. Anaspis nubila, linearis, flava pubescens, subtiliter dense punctulata, thorace latitudine fere duplo breviore, semicirculari, elytris fascia lata media indeterminata nigra, antennis nigris, basi flavis; subtus fusca, pedibus flavis. Long. ·09.

Tejon. No sexual appendages on the abdomen of the specimens examined.

107. Mordella scutellaris.

108. Lytta smaragdula. A specimen perhaps belonging to this species, found at Tejon, is of a purplish color, with the antennæ longer than in the type, with the external joints nearly twice as long as wide. It does not differ in any other character, and I am therefore for the present unwilling to separate it.

109. Lytta puncticollis.

110. Nemognatha scutellaris.

111. Pedilus punctulatus.

112. Ascleva excavata.

113. Bruchus desertorum. 114. B. pauperculus.

115. Rhyncites bicolor.

116. Sitones californicus.

117. Lixus pleuralis.

118. Baridius nasutus, elongatus niger, nitidus, rostro thorace haud breviore, tenui parum arcuato, seriatim punctato, fronte constricta, capite parce punctulato, thorace latitudine longiore, lateribus late rotundatis, apice breviter constricto, fortiter sat dense punctato, ad latera parce albo-pubescente, elytris striis profundis punctatis, interstitiis planis, uniseriatim punctulatis et albo-pubescentibus, antennis tenuibus, articulo 2ndo elongato, 3io sequente paulo longiore. Long. ·18.

One specimen, Tejon.

119. Centrinus lineellus, breviter fusiformis, niger, subtus squamulis ochreis argenteo-nitentibus dense tectus, rostro thorace longiore, arcuato, apice remote subtiliter basi fortiter punctato, linea media lævi, capite nudo parce punctulato, thorace dense punctato, nigro-squamoso, vittis tribus latis ochreo-squamosis, elytris nigro-squamosis, profunde striatis, vittis duabus integris intermediaque basali ochreo-squamosis. Long. ·12.

One specimen, Tejon. The inner vitta occupies the whole of the 2nd interval and the 3rd from the apex to within one-fourth of the base: the short basal vitta is on the 4th, and extends about one-sixth of the length: the external vitta covers the 6th interval to the middle, then occupies the 7th and 9th: a few scattered yellow scales are seen near the margin. The commissures of the abdomen and the coxæ are black. The feet are sparsely clothed with scales.

120. Sphenophorus subcarinatus.

121. Sphenophorus simplex, niger, subnitidus, rostro cylindrico, subtiliter punctato, ad basin canaliculato, capite lævi, thorace oblongo, latitudine longiore, lateribus late rotundatis, ad apicem subito constricto et tubulato, fere æqualiter punctato, ante scutellum obsolete impresso, et paulo grossius punctato, elytris striis profundis externis punctatis, interstitiis alutaceis planis subtiliter parce punctulatis, tibiis anticis intus late sinuatis, posterioribus intus unidentatis et fimbriatis, antennis piceo-rufis. Long. ·32—·36.

Tejon. Varies with the legs reddish yellow. The small punctures of the intervals of the elytra are irregular on the sutural and alternate spaces, but form a single series on the second and alternate spaces: the external striæ are distinctly punctured; the interior ones appear smooth, but with a powerful lens they are seen to be slightly punctured.

121. Callidium blandum, elongatum rufo-testaceum, parce breviter pallide pubescens, thorace latitudine vix breviore antice parum, postice distincte constricto, lateribus rotundatis, parce punctato, elytris obscure cyaneis confertim punctatis, abdomine nigricante, antennis obscuris basi rufis. Long. ·25.

Tejon. Closely allied to C. amœnum *Say*, but is narrower, with the elytra more densely punctured, the abdomen blackish, and the feet entirely rufous.

122. Callidium obscurum, fusco-nigrum, haud nitidum, pilis fuscis suberectis vestitus, capite thoraceque confertissime punctatis, hoc longius parce piloso, lateribus rotundatis, postice angustiore, linea obsoleta dorsali, calloque postico lævibus, elytris parce punctatis, punctis ad basin grossis, postice subtilibus, femoribus valde incrassatis, tibiis parce longe pilosis. Long. ·48—·55.

Tejon. Allied to C. dimidiatum, but from its larger size and uniform color it looks like a Tetropium.

BROTHYLUS.

Oculi rude granulati: palpi compressi, breves: antennæ simplices articulo 4to contiguis fere duplo breviore: mandibulæ apice acutæ. Thorax lateribus rotundatis tuberculo acuto armatis, dorso bicallosus, elytris apice conjunctim rotundatis. Pedes mediocres, femoribus haud clavatis, tarsis posterioribus articulo 1mo sequentes duo æquante.

Belongs to the same group with Eburia and Elaphidion, but differs remarkably by the 4th joint of the antennæ being about half as long as the 3d or 5th.

123. B. gemmulatus, fusco-piceus, pube brevi helva vestitus, capite thoraceque rude punctatis, hoc latitudine haud breviore, lateribus antice rotundatis, postice sinuatis, tuberculo acuto ad medium armatis, dorso ad medium utrinque tuberculo sublævi munito, elytris thorace latioribus, subtillissime rugose punctulatis, granulis majusculis parcis nitidis, postice sensim punctis fientibus. Long. ·67.

Tejon, two specimens. The granules are very scattered, larger at the base, gradually becoming smaller, they are converted into punctures at the tip.

124. Elaphidion lineare, valde elongatum, testaceum, parce minus subtiliter albo-pubescens, thorace latitudine longiore, lateribus rotundatis, confertim grosse punctato, callo dorsali postico lævi, elytris fortiter punctatis apice emarginatis, vix bispinosis, femoribus muticis, antennarum articulis 3, 4 et 5 spina brevi apicali armatis. Long. ·41.

Tejon, one specimen. Quite as slender as Sclerocerus rigidus.

125. Clytus nauticus.

126. Acmæops falsa, elongata, nigra, pube brevi albida incana, thorace convexo, lateribus rotundatis, postice transversim impresso, et in lateribus vix constricto, angulis posticis obtusis, rufo nitido haud dense punctato, elytris confertim punctatis, thorace latioribus parallelis apice rotundatis. Long. ·28.

One specimen, Tejon. By its color this species recedes from Acmæops and resembles various Lepturæ, but the characters, as well as the form of thorax, belong to this genus.

127. Toxotus nubifer, capite nigro punctato, thorace nigro subtiliter punctulato, latitudine longiore, antrorsum angustato, antice posticeque constricto, tuberculo laterali magno obtuso, elytris humeris prominulis, postice sensim angustatis apice oblique intus truncatis, dense subtilissime punctulatis et rugosis, nigricantibus, margine basali laterali apicalique late piceo-rufo; pectoribus nigris, abdomine antennis palpis pedibusque piceo-rufis. Long. ·70.

One specimen, Tejon.

128. Leptura læta.

129. Leptura 6-spilota, nigra, dense fulvo-pubescens, thorace latitudine haud longiore, convexo, confertissime punctato, lateribus rotundatis, a medio antrorsum angustato, angulis posticis parvis acutis, elytris sat fortiter punctatis, postice sensim angustatis, apice singulatim rotundatis, pallide flavis, sutura limboque toto anguste nigris, macula utrinque ante medium alterisque tribus margini cohærentibus nigris, antica angustiore, alteris magnis quadratis: femoribus rufo-testaceis, tibiis tarsisque infuscatis, antennis fuscis. Long. ·24—·33.

Tejon, abundant. Belongs to the same group as L. instabilis, convexa, cordifer, &c.

The anterior marginal spot is only a slight dilatation of the black margin, and extends from the base one-fourth the length of the elytra: the second spot is quadrate extending from the margin half way to the suture, the third is transverse, quadrate, situated one-fourth from the apex, and sometimes nearly reaches the suture.

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130. Tetraopes m a n c u s, niger, supra coccineus, breviter nigro-pubescens, thorace parce punctato, tuberculo laterali prominulo obtuse rotundato, umbone dorsali modice sed subito elevato, guttis 4 nigris solitis definito, elytris modice punctatis, gutta humerali alteraque utrinque pone medium nigris ornatis, scutello nigro, pedibus totis nigris, antennis cinereo-annulatis, articulo primo sæpe rufo-tincto. Long. ·55—·61.

Tejon, abundant. Spotted like T. 5-m a c u l a t u s, but the middle of the thorax is more elevated, the lateral tubercles more prominent, the elytra less coarsely punctured, and the antennæ annulated with cinereous hair.

131. Saxinis s a u c i a. Three specimens from Tejon differ from more northern specimens by the thorax and elytra being more strongly punctured. Such differences between forms presenting otherwise similar specific characters are found in several genera of Chrysomelidæ. I leave the investigation of their nature for a future occasion.

132. Exema c o n s p e r s a. Abundant.

133. Cryptocephalus a u r a t u s, (*chalconatus* Mann.)

134. Pachnephorus ? s m a r a g d u l u s. Abundant.

135. Chrysochus c o b a l t i n u s.

136. Glyptoscelis a l b i d u s, oblongus, obscure cupreus, densissime albo-pubescens, thorace confertim punctato, latitudine haud breviore, lateribus late rotundatis, elytris thorace latioribus confertim punctatis. Long. ·30.

Tejon: a specimen from Sacramento was given me by Mr. S. S. Rathvon. Differs from G. hirtus, (*Eumolpus hirtus* Ol. *Eu. pini* Say,) by the punctures being smaller, by the thorax being narrower and less rounded on the sides and by the hair being of a uniform whitish color. The genus G l y p t o s c e l i s (Chevr.) is distinguished from the other genera allied to Eumolpus by the mouth not being covered beneath by the prosternum, by the claws being toothed, and by the tibiæ being longitudinally sulcate. The head is not sculptured as in Heteraspis.

137. Œdionychis v i o l a s c e n s, ovata, convexa, chalybeo-violacea, thorace latitudine duplo breviore, antrorsum angustato, angulis anticis prominulis posticis rectis, fortiter haud dense punctato, elytris confluenter haud subtiliter punctatis. Long. ·24.

Tejon, two specimens. From its color, it appears at first sight to be a Haltica of the division Graptodera.

138. Phyllobrotica f l a v i c o l l i s, cyanea, thorace flavo, latitudine paulo breviore, subquadrato, lateribus late rotundatis, disco postice late haud profunde impresso, elytris punctulatis, antennis basi testaceo-maculatis. Long. ·28.

Tejon. Resembles in form Galleruca a t r i v e n t r i s *Say*, and belongs to the same genus as that species, which has a remarkable peculiarity not before noticed: in the male the third joint of the antennæ is obsolete, so that the organs become 10-jointed. I have not yet examined any males of the present species.

139. Phyllobrotica b i v i t t a t a, flava nitida, oculis vittaque elytrorum a humero fere ad apicem extensa nigris, thorace latitudine breviore, lateribus rotundatis; elytris obsolete punctulatis. Long. ·18.

Fort Tejon. A very pretty little species, without any thoracic impressions.

140. Diabrotica v i r i d i p e n n i s, capite flavo, occipite nigricante, thorace flavo, latitudine breviore, lateribus rectis parallelis, disco postice profunde lunatim excavato, elytris subtiliter punctulatis cyaneo-viridibus, postpectore abdomineque nigris pube albida canis, pedibus flavis, antennis fuscis, basi flavis. Long. ·25.

Tejon. I know not the value of this or the preceding genus, nor the characters upon which they rest: the habitus is sufficient to enable them to be readily recognized, but future researches will be necessary to establish them fully.

141. Diabrotica 12-punctata.

142. Galleruca guttulata. 143. G. luteocincta.

144. Microrhopala signaticollis, nigro-cyanea, capite tristriato, thorace latitudine breviore, antrorsum angustato, lateribus rectis, parce grosse punctato, macula maxima laterali a basi fere ad apicem extensa rufo-flava, elytris thorace latioribus subparallelis, apice late rotundatis, punctis grossis seriatim positis, seriebus per paria paulo approximatis. Long. ·23.

Tejon, one specimen. This species has the form, size, and sculpture of Hispa cyanea *Say*, except that the thorax is more sparsely punctured. The lateral yellow spots readily distinguish it from all others seen by me.

145. Hippodamia punctulata. 146. H. obsoleta.

147. Mycetina morosa, elongata, nigro-picea nitida, thorace vix punctulato, latitudine paulo breviore, lateribus parallelis antice rotundatis, disco concavo, inæquali, linea transversa basali medio profunde exarata extrorsum subtiliore, impressionibus basalibus brevibus profundis, elytris thorace paulo latioribus, elongato-ovalibus punctulatis. Long. ·27.

Tejon, one specimen. This species has very much the same proportions as M. laeta, (*Epipocus lætus* Lec.)

Supplement.

I have, for the purpose of making these pages a complete record of the additions to our Pacific Coleopterous Fauna, here collected notes and descriptions of species derived from various sources, which have not been mentioned in my Report on the Coleoptera of Pacific North America, for the P. R. R. Expl. of 47th Par., or in the Catalogue of Coleoptera found adjacent to the U. S. and Mex. Boundary, printed in the 4th vol. of the second series of the Journal of the Academy. I propose, from time to time, as fresh material is furnished by the kindness of my friends, to give other supplements to the Pacific Coleoptera Fauna of the United States.

1. Dromius quadricollis, nigro-piceus, depressus, thorace latitudine breviore, quadrato, postice subangustato, transversim rugoso, postice profundius impresso, lateribus latius marginatis pallidioribus, elytris oblongis, striatis interstitiis parum convexis, subtus piceus. Long. ·28.

Puget Sound, Mr. George Davidson. Very closely allied to D. piceus, but differing chiefly in the form of the thorax: the latter is broader than long, scarcely narrowed behind, with the depressed margin broader, the disc more rugous, the dorsal line deeper, and the posterior transverse impression deeper; the posterior angles are also more regularly rounded, and the elytra are a little broader.

2. Cymindis abstrusa, picea, pubescens, capite thoraceque fortiter punctato, fronte lævi, thorace latitudine breviore, postice angustato, lateribus retusdatis postice subsinuatis, margine latius reflexo pallidiore, angulis posticis obtusis, basi late rotundato, linea dorsali profunda, elytris oblongo-ovalibus nitidis, striis antice punctatis, interstitiis planis, confuse subtiliter punctatis, margine pallido, antennis castaneis, abdomine pedibusque piceo-testaceis. Long. ·41.

Washington Territory, Dr. Kennerly. Of the size of C. laticollis, but with the elytra shining, and the thorax more broadly margined: from C. reflexa it differs by its larger size, broader elytra, and less coarsely punctured head and thorax; the latter is also comparatively more narrowed behind, with the posterior angles less obtuse.

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3. Platynus b e m b i d i o i d e s (*Sericoda bemb.* Kirby). A specimen was found on Puget Sound by Mr. Davidson, which in no respect differs from one found by me at Lake Superior.

4. Pterostichus h e r c u l a n e u s Mann. A specimen (·70 long) was found by Mr. Davidson on Puget Sound, which apparently belongs to this species. It is related to P. a l g i d u s, but the two basal impressions each side run into a large fovea as in P. c o r a c i n u s, &c., without, however, leaving any prominence or punctures between them; the little ridge adjacent to the margin is more distinct. The elytra have a faint purplish tinge as in P. a m e t h y s t i n u s.

5. Anisodactylus s e m i p u n c t a t u s, oblongus, niger, vel æneo-niger nitidus, capite punctulato, postice parce punctato, thorace latitudine sesqui breviore, postice subangustato, lateribus rotundatis, postice obliquis subdepressis, angulis posticis obtusis, confertim subtiliter punctato, basi utrinque paulo impresso, elytris striatis, interstitiis planis alternis parce punctulatis et breviter pubescentibus, stria 2nda postice unipunctata. Long. ·45—·5.

Oregon, Dr. Suckley, California. Resembles in form A. b r e v i c o l l i s Lec, but is distinguished among the black species, having the spur of the anterior tibia toothed each side at base, by the small punctures of the alternate spaces of the elytra. These punctures are sometimes, however, hardly distinct, in which case this may be distinguished from A. brevicollis, consobrinus and californicus, as well by differences in form, as by the sides of the thorax being more distinctly and broadly depressed, and from A. s i m i l i s by the thorax being more narrowed behind, with the posterior angles more obtuse. I find, on careful examination, that the last named species presents traces of fine punctures on the alternate spaces of the elytra.

6. Agonoderus r u g i c o l l i s, nigro-piceus, thorace testaceo, macula oblonga centrali nigro, latitudine haud breviore, postice paulo angustato, lateribus postice subsinuatis, basi late rotundato subdepresso punctato, angulis posticis rectis rotundatis, elytris testaceis striis profundis, 2nda unipunctata, interstitiis subconvexis, 2, 3 et 4 a quadrante ultra dodrantem nigris, antennis pedibusque testaceis. Long. ·28.

California, Mr. Rathvon. Very similar to A. dorsalis and pallipes, with the posterior angles of the thorax more rounded than in the former, but less than in the latter; it differs from both by the sides being slightly sinuous, by the base being more depressed and punctured, by the disc being very distinctly rugous, and finally by the intervals of the elytra being less convex.

7. Badister a n t h r a c i n u s, niger, nitidus, thorace latitudine sesqui breviore, postice paulo angustato, angulis posticis obtusis rotundatis, anguste marginato, antice transversim impresso, linea dorsali sat profunda, basi utrinque late impresso alutaceo, elytris striis profundis, 2nda bipunctata. Long. ·25.

Oregon, Dr. Suckley.

8. Bembidium i n d i s t i n c t u m. 9. B. c o n n i v e n s; Oregon, Dr. Suckley.

10. Bembidium e r a s u m, nigro-æneus, nitidissimus, thorace latitudine breviore, convexiusculo, lateribus rotundatis postice paulo angustato, foveis basalibus profundis bistriatis, basi punctato, elytris thorace latioribus, subconvexis, striis internis 2 vel 3 subtiliter punctulatis, externis omnino obliteratis, 3ia profunde bipunctata. Long. ·17.

Oregon, Dr. Suckley. Related to B. tetraglyptus, but is more convex and much more shining, with the thorax narrower, and the basal foveæ deeper and punctulate; the carina at the angle is very distinct.

11. Bembidium o b l i q u u l u m, latiusculum, æneum, thorace latitudine sesqui breviore, ante medium angustato et lateribus rotundato, angulis posticis rectis, basi transversim profunde impresso et utrinque bifoveato, fovea externa obliqua, carina angulari minuta, elytris striis internis 4 vel 5 punctulatis, externis obliteratis, interstitio 3io bipunctato, femoribus nigro-piceis, tibiis tarsisque picco-rufis. Long. ·24.

California, Mr. Rathvon. Related to B. nitidum, (*Eudromus n.* Kirby) but differs by the less shining surface, the obliquity of the external basal fovea, and the color of the legs.

12. Nebria livida, aptera testacea, thorace postice angustato, lateribus parum sinuato, angulis posticis subrectis, elytris octostriatis, stria 3ia quadrifoveata, 5ta bifoveata, 6ta trifoveata. Long. ·43.

Cape Flattery; Dr. Newberry. Body depressed, uniform pale testaceous; head smooth, with faint impressions. Thorax wider than the head, one half wider than long, gradually, but consideribly narrowed posteriorly, sides rounded in front, very faintly sinuate behind, posterior angles slightly obtuse, not at all rounded, dorsal line entire, transverse impressions well marked, base sparsely punctured and rugous, basal impressions not elongated, lateral margin moderate. Elytra almost elliptical, with eight moderately deep striæ, not punctured, but marked with rows of brown quadrate cells in the substance, simulating punctures, the third stria has four or five punctures, the fifth has two to five behind the middle, the sixth has three or four also behind the middle, the scutellar stria is short; at the widest part they are one half wider than the thorax.

13. Necrophilus tenuicornis, elongato-ovalis, nigro-piceus, parum convexus, thorace latitudine duplo breviore, lateribus rotundatis indeterminate piceis, angustius depressis, parce subtiliter punctato, fortius versus latera, elytris striis subtiliter crenulatis, 2nda 4taque punctis pluribus impressis, antennis fere filiformibus, articulis externis crassitie fere duplo longioribus, pectore pedibusque piceis. Long. ·22.

Puget Sound, Mr. Davidson. Much smaller and narrower than N. hydrophiloides, larger and narrower than N. latus, but specially distinguished from both by the antennæ not being thickened externally: the second joint is almost equal to the fourth, and the third is scarcely one half longer than either. By these characters it approaches Pteroloma, but the mandibles are not many toothed, nor are the palpi acuminate at tip, and the inner lobe of the maxillæ appears as in Necrophilus: the legs are also moderate in length as in the latter genus.

14. Peltis serrata, oblongo-ovalis, sordide atra, opaca, rude punctata setis erectis curvatis hispida, elytrorum thoracisque lateribus fortiter serratis, thorace inæquali medio elevato, canaliculato, angulis posticis elongatis spiniformibus, elytris tricostatis, internis duabus interruptis in callis magnis postice desinentibus. Long. ·40.

Washington Territory, collected on the N. W. Boundary Survey, by Mr. Geo. Gibbs. This species closely resembles P. silphides, (*Boletophagus silphides* Newman, which was considered as identical with P. dentata, of Northern Europe, by Dejean.) It is however larger, somewhat narrower, and has the posterior angles of the thorax more elongated and prominent.

15. Aulonium aequicolle, elongatum parallelum, nigrum nitidum, capite thoraceque subtilius punctatis, hoc latitudine vix longiore, lateribus late rotundatis, lineis solitis insculptis, disco æqualiter paulo convexo, elytris punctulatis, striis punctatis postice obliteratis. Long. ·20.

Sacramento Valley, Mr. Rathvon. Of the same form and sculpture as Au. parallelopipedum, and differing only by the thorax being not at all excavated or tuberculate anteriorly, and by the sides being a little more rounded.

PSEUDOPHANUS.

Palpi maxillares articulo ultimo elongato, cylindrico; mandibulæ breves: antennæ corpore breviores, articulis externis vix crassioribus, 1mo crassiore conico paulo longiore: caput linea utrinque supraoculari insculpto; pedes mediocres, tarsis brevibus, articulo 1mo parvo, 2ndo triangulari, 3io 2ndo æquali longe bilobato, 4to vix conspicuo, 5to longiore unguiculis parvis.

A genus having very much the form of Telephanus, but differing by the cylindrical palpi, and small fourth joint of the tarsi: as habitual characters, the body is more densely punctured, and the head each side has a longitudinal line running from the base of the antennæ.

16. P. signatus, elongatus, testaceus, pubescens, capite thoraceque dense punctulatis, hoc latitudine longiore lateribus rectis serrulatis, angulo utrinque prope apicem obtuso, disco postice vage impresso, punctis versus basin majoribus; elytris basi truncatis, humeris obtusis, striis punctatis, postice fere obliteratis, interstitiis dense punctatis, 4to, 6to et 8vo paulo latioribus, plaga scutellari, altera communi ad medium, guttaque utrinque postica cum mediali connexa nigricantibus; antennarum articulis 8, 9 et 10 infuscatis. Long. ·18.

Puget Sound, Mr. Davidson. A very pretty little insect: the markings on the elytra present a scutellar triangle, and a medial spot having the form of the head of an arrow.

17. Ceruchus striatus, piceo-niger, nitidus, capite thoraceque grosse parcius punctatis, fronte late concava, elytris striis profundis in fundo densius, costis parcius grosse punctatis, antennis rufis. Long. ·68.

One female, found at Shoalwater Bay, by Dr. Cooper, and another in Washington Territory, by Mr. Gibbs. Resembles in proportions C. piceus, but is much larger: the thorax is more convex and the elytra more deeply striate and much more punctured.

18. Corymbetes tinctus. Several specimens of a species were found by Dr. Kennerly and Mr. Gibbs, in Washington Territory, having the elytra of a metallic green or purplish color. These resemble closely in appearance C. aeripennis, and differ only by the thorax being less narrowed in front, more broadly rounded on the sides, and by the striæ of the elytra being deeper, the interstices slightly convex and more rugous, and by the feet being piceous tinged with rufous. C. carbo, besides having both body and feet entirely black, has the thorax still less narrowed in front, more strongly punctured, and the prosternum more coarsely punctured.

19. Corymbetes protractus, elongatus, linearis, piceo-niger, thorace longius elytris breviter cano-pubescentibus, illo latitudine fere sesqui longiore, parum convexo, crebre punctato, lateribus rectis fere parallelis, angulis posticis acutis divergentibus, haud carinatis, elytris striatis, interstitiis convexis confertim punctatis, antennis articulo 3io 4to æquali. Long. ·58.

Oregon, Dr. Cooper. A very distinct species having the form of the male of C. pyrrhos.

20. Dolopius opaculus, testaceo-piceus, opacus, helvo-pubescens, thorace lateribus postice pallidioribus dense punctato, paulo convexo, latitudine sublongiore, antrorsum sensim angustato, lateribus ante medium rotundatis, angulis posticis acutis carinatis, ante scutellum breviter canaliculato, elytris a basi sensim angustatis, striis punctatis, interstitiis vix convexis, confertissime punctatis; coxis posticis laminis intus subito dilatatis, pedibus antennisque fere testaceis, his articulis 2 et 3 æqualibus, singulis 4to paulo brevioribus. Long. ·27.

One specimen, Puget Sound, Mr. Davidson. Distinct from all others in my collection, by its form, which approaches that of the small Monocrepidii with simple tarsi, (M. dorsalis, &c.)

21. Elater tartareus, niger opacus, cuneiformis, breviter nigro-pubescens, thorace confertissime punctato, latitudine longiore paulo convexo, antrorsum sensim angustato, lateribus late rotundatis, elytris striis punctatis, interstitiis confertim scabro-punctatis, antennis valde serratis, articulis 2 et 3 parvis æqualibus. Long. ·39.

Puget Sound, Mr. Davidson. Belongs to my division A. (Trans. Am. Phil. Soc. 10, 463,) and is related to E. turbulentus Lec.

22. Adelocera cavicollis, nigro-picea opaca, ferrugineo subvariegata, squamis luteo-sordidis inæqualiter vestita, thorace latitudine haud longiore, lateribus undulatis antice valde rotundatis, margine late depresso et reflexo, disco triangulariter maxime excavato, et antice utrinque fovea magna impresso, elytris dorso depressis, versus latera declivibus (ita ut costa obsoleta discoidea efformatur,) sulcis tarsorum nullis, antennarum prope coxas desinentibus. Long. ·65.

One specimen, found by Dr. Newberry on the shores of Tlamath Lake. Allied to A. brevicornis Lec., but very different by the larger and deeper excavations of the thorax.

This species is unfortunately the only relic of a large collection made along the western border of the great basin: a region in which previously no collections had been made, and from which many most interesting species may be expected.

23. Cardiophorus fenestratus, niger nitidus, omnium subtilissime punctulatus, pube brevissima albida incanus, thorace latitudine haud longiore, utrinque angustato, lateribus rotundatis, modice convexo, postice obsolete canaliculato, striis basalibus elongatis, elytris striis fortius punctatis, interstitiis parum convexis, maculis rotundatis flavis, duabus ad medium, duabus ante apicem ornatis. Long. ·25.

Puget Sound, Mr. Davidson. Of the same form as C. tumidicollis but with the thorax less convex.

PTEROTUS.

Corpus elongatum, alatum; caput breve, oculis magnis; antennæ paulo distantes, in foveis magnis insertæ, articulo 1mo brevi conico, 2ndo duplo minore, crassitie vix longiore, 3—10 elongatis, ramo interno articulo quadruplo longiore ad medium emittente, 11mo ramum præcedentis æquante. Palpi maxillares mediocres crassiusculi, articulo ultimo haud latiore: mandibulæ elongatæ, tenues, simplices. Thorax brevis trapezoideus, margine laterali et apicali reflexo. Elytra linearia, elongata apice rotundata. Coxæ anticæ et intermediæ magnæ conicæ contiguæ; posticæ parum prominulæ: abdomen articulis 7 ventralibus, lateribus serratum: 7mo profunde emarginato, segmento anali (maris) elliptico. Tarsi tibiis haud breviores, articulo 1mo sequentibus duobus haud breviore, 4to subtus lobato: unguiculari tenui longiore, unguiculis ad basin dilatatis.

A singular genus, which I have described at great length from my inability to place it properly. It seems to have a mixture of characters belonging to the Lampyrides, Telephorides and Drilides, but from the small size of the posterior coxæ is probably better placed with the latter. The antennæ are somewhat separated, inserted in large cavities, the edges of which being elevated make the front concave; it is difficult to say whether they are in front of or between the eyes. I cannot determine whether the labrum is distinct or not. The mandibles are very long, curved and slender as in Lampyrides. None of the ventral segments are phosphorescent.

24. P. obscuripennis, elongatus flavo-testaceus, subtiliter pubescens, thorace trapezoideo, latitudine duplo breviore, marginato, (latius ad latera et apicem,) punctulato, subtiliter canaliculato, elytris nigro-piceis, fortiter dense punctatis, lineis 4 parum elevatis. Long. ·50.

Sacramento Valley, Mr. Rathvon.

ANORUS.

Corpus elongatum, lineare. Caput latiusculum, oculis majusculis, ore angusto, sutura clypeali distincto, clypeo brevi, trapezoideo, labro late rotundato. Antennæ distantes, ante oculos insertæ, 11-articulatæ, articulo 1mo crassiore conico, 2ndo duplo breviore, 3io 1mo æquali, 4—11 sensim paulo longioribus et angustioribus. Mandibulæ crassæ, acutæ. Palpi tenues, maxillares articulo ultimo longiore. Coxæ anticæ conicæ, contiguæ, trochantino maximo; proster-

no haud producto; intermediæ conicæ obliquæ, paulo distantes, mesosterno antice prominulo breviter carinato: posticæ obliquæ laminis intus sensim dilatatis: pedes mediocres, tibiis calcaribus distinctis, tarsis articulo 1mo longiore, 2 et 3 subtus lobo membraneo, 4to lobis duobus membraneis instructis, unguiculis simplicibus. Abdomen sub-6-articulatum, articulo 6to (maris ?) apice rotundato, retractili.

A genus which appears to belong to the Atopidæ, though very distinct from those mentioned in Lacordaire's work.

25. A. piceus, piceus nitidus, minus subtiliter cinereo-pubescens, capite thoraceque punctulatis, hoc latitudine plus duplo breviore, antrorsum modice angustato, lateribus rotundatis, basi late bisinuato, elytris seriatim punctatis, substriatis. Long. ·33.

San Diego, California: June. I have previously neglected to describe this insect from my uncertainty in regard to its position. I trust that the previous description will enable it to be recognized, for although there is nothing remarkable in the appearance of this dark brown, hairy narrow insect, there is hardly any genus with which it may be compared.

26. Anobium marginicolle, fuscum, subtilissime punctulatum, breviter pubescens, thorace latitudine breviore, lateribus valde rotundatis fortiter marginatis, elytris thorace latioribus, elongatis, vix obsoletissime striatis, antennis articulis 3 ultimis singulatim articulos 4—8 longitudine æquantibus: oculis majusculis prominulis. Long. ·21.

Puget Sound, Mr. Davidson. Belongs to the division *Dryophilus* Chevr., and differs from a nondescript Pennsylvanian species given me by Dr. Melsheimer, by the thorax being strongly margined on the sides, by the last joints of the antennæ being comparatively less elongated, and by the eyes being less prominent.

27. Anobium quadrulum, cylindricum, piceum, pube brevi cinerea sericans, thorace latitudine breviore, inæquali, scabro, lateribus subsinuatis valde marginatis, angulis posticis subrectis, basi late rotundato, scutello densius pubescente, elytris fortiter seriatim punctatis, interstitiis subtilissime punctulatis, antennis articulis 3 ultimis conjunctis præcedentes æquantibus. Long. ·18.

Puget Sound, Mr. Davidson. Allied to A. foveatum *Kirby*, but is less elongate, with the sides of the thorax less sinuous, the posterior angles not acute but subrectangular, and the base much less rounded.

28. Anobium cornutum, nigrum, cylindrico-ovale, subtiliter punctulatum, pube brevissima cana vix conspicua vestitum, thorace latitudine duplo breviore, modice convexo, lateribus præcipue ante medium rotundatis, basi late rotundato, angulis posticis rectis prominulis, antennarum articulis 3 ultimis conjunctis reliquos fere æquantibus. Long. ·11.

Mas, mandibulis cornu erecto tenui, capite sesqui longiore apice incurvo, armatis; femina mandibulis simplicibus.

California. This interesting species was sent me by Mr. Andrew Murray, as having been hatched in great numbers from some galls sent from California. The two horns of the male meet at their incurved tips.

Scotobænus.

Corpus elongatum oblongum, apterum, elytris haud connatis. Clypeus planus antice truncatus: labrum late rotundatum: mentum parvum subhexagonum medio subelevatum, apice liberum, fere truncatum: antennæ extrorsum paulo crassiores, articulo 2ndo brevi, externis 4 vel 5 rotundatis. Pedes mediocres, femoribus paulo clavatis, tibiis angustis, linea interna insculptis, tarsis tibiis fere duplo brevioribus, articulis subtus flavo-villoris, articulo posticorum 1mo paulo longiore.

Allied to Upis, Centrionipus, Nyctibates, &c., but easily distinguished by the above noted characters.

29. S. parallelus, elongatus, niger, subnitidus, capite thoraceque subtilius sat dense punctatis, hoc latitudine paulo breviore, postice paulo angustato, lateribus late rotundatis, angulis posticis acutis, elytris thorace haud latioribus, seriatim punctatis, interstitiis sat dense subtiliter punctatis. Long. ·75; lat. ·30.

Sacramento Valley, Mr. Rathvon. The humeri are obtuse, very slightly rounded.

30. Phryganophilus collaris, elongatus niger, capite dense punctato, thorace latitudine plus sesqui breviore, antice angustato, lateribus valde rotundatis, basi bisinuato, disco utrinque late transversim oblique excavato, punctulato, rufo, medio nigricante, elytris thorace haud latioribus confertissime granulato-punctatis, antennis extrorsum paulo incrassatis, articulo 3io 4to æquali; abdominis articulo ultimo rufo. Long. ·33.

Washington Territory, Mr. Gibbs. The palpi and feet are destroyed: it is perhaps a Phryganophilus, but in the absence of an authentic type of the genus for comparison, I cannot be certain.

31. Anaspis nigriceps, elongata, flavo-testacea, subtiliter pubescens, transversim subtiliter strigoso, capite nigro, ore palpisque flavis, thorace latitudine duplo breviore, lateribus rotundatis, subtus fusca, antennis fuscis basi flavis, pedibus coxisque flavis, tarsis posterioribus fuscis. Long. ·11.

Oregon, Dr. Suckley. Smaller than A. pallescens Mann. and differing in the color of the head and under surface. No sexual characters observed.

32. Elaphidion procerum, (femina,) picea, tenuiter minus dense brevissime sordide pubescens, thorace latitudine breviore, lateribus rotundatis, in et versus latera inæquali, confluenter foveatim punctato, linea dorsali lævi, sulco basali profundiore, elytris antice modice, postice subtiliter punctatis ad apicem truncatis bispinosis, spina interna longiore, femoribus haud spinosis, antennis articulo 3io spina interna brevi, spiculoque externo obsoleto, sequentibus spinula externa alteraque interna armatis. Long. 1·50.

Umpqua Valley, Dr. Newberry. Closely resembles the female of E. simplicicolle Hald. (*E. pulverulentum* Hald.,) but is much larger, with the sutural spine of the elytra longer than the outer one; the thorax is less rounded, much more coarsely punctured, with the basal groove deeper; the dorsal elevation is also linear, there is an anterior oblique discoidal callus each side, and the sides are quite distinctly impressed: in E. simplicicolle the discoidal callus is not seen and the sides are hardly impressed.

33. Leptura xanthogaster, elongata, nigra, opaca, capite thoraceque parce longe flavo-villosis, dense punctatis, hoc convexo, latitudine longiore, campanulato, lateribus subangulatis ante basin paulo angustato, et profunde transversim sulcato, elytris humeris elevatis, postice sensim paulo angustatis, punctatis flavis nitidis parce breviter flavo-pubescentibus, macula oblonga subhumerali, altera laterali ad medium, trienteque postico nigris, abdomine pedibusque flavis, tibiis ad apicem tarsisque anterioribus infuscatis. Long. ·43.

Shoalwater Bay, Dr. Cooper. Of the same form and size as L. crassipes *Lec.*, but it differs by the absence of the subapical round yellow spot of the elytra, as well as by the yellow abdomen.

34. L. quadrillum, nigra parum nitida, capite thoraceque confertissime punctatis, pube brevi erecta minus dense vestitis, hoc valde convexo, lateribus rotundatis, ante basin transversim sulcato, angulis posticis haud productis; elytris ad basin thorace tertia parte latioribus, humeris elevatis, a basi angustatis, ad apicem oblique truncatis, angulo externo acuto, sat dense punctatis, parce breviter pubescentibus, guttis tribus ad marginem pallide flavis ornatis, prima basali, secunda obliqua paulo ante medium, tertia pone medium, alteraque elongata pone medium subsuturali, sæpe deficiente ornatis. Long. ·42.

Shoalwater Bay, Dr. Cooper, Washington Territory, Messrs. Gibbs and Ken-

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nearly. The basal spot of the margin is concealed in a dorsal view by the prominent shoulders, within which the disc is obliquely impressed. The thorax is nearly as in L. v a g a n s, but the form of the elytra is very different; the species belongs in the neighborhood of L. p u b e r a *Say*. The subsutural spot forms with the posterior lateral one a transverse band stretching forwards along the suture: there is sometimes also a scutellar yellow spot.

35. L. l æ t i f i c a, nigra opaca, pube erecta nigra brevi parce vestita, capite thoraceque confertissime punctatis, hoc antrorsum sensim angustato, latitudine baseos vix longiore, lateribus late rotundatis, angulis posticis vix prominulis, disco postice subimpresso, ad basin marginato, elytris thorace latioribus, vix triangularibus, læte coccineis opacis, antice fortiter, postice subtilius punctatis, gutta quadrata prope suturam ante medium, alteraque versus marginem ad medium, nonnunquam deficientibus, margineque apicali nigris; postice paulo dehiscentibus ad apicem truncatis, angulo externo acuto, suturis ventralibus rufo-piceis. Long. ·43.

Shoalwater Bay, Dr. Cooper; Washington Territory, Mr. Gibbs. The antennæ are entirely black, subserrate and slightly thickened towards the tip, extending to the anterior fourth of the elytra. This species may be placed between the groups of L. canadensis and L. vagans.

36. Leptura s a n g u i n e a, nigra, opaca, pube erecta parce vestita, capite thoraceque confluenter dense punctatis, hoc ante medium antrorsum sensim angustato, latitudine paulo longiore, lateribus rotundatis, utrinque vix constricto, angulis posticis vix prominulis, elytris thorace latioribus, triangularibus, læte rufis, confertim punctatis, postice paulo dehiscentibus, apice oblique truncatis et nigro-marginatis. Long. ·4.

W. Territory, Mr. Gibbs. Allied to the preceding, but differs by the thorax being less narrowed in front, and the elytra much more closely punctured. The male has the thorax narrower and the outer margin of the elytra blackish.

37. Leptura d e h i s c e n s, minus elongata, nigra pube parca fulva erecta antice vestita, capite thoraceque dense fortiter punctatis, hoc convexo, lateribus valde rotundatis, antice multo angustiore, apice marginato, basi transversim impresso, elytris postice subangustatis obscure rubris, confertim punctatis, sutura postice rotundata valde dehiscente, apice haud acuto infuscato. Long. ·5.

Oregon, Dr. Suckley. Allied to L. v a g a n s, but with the punctures smaller and more dense, the elytra less triangular and not acute at apex: the antennæ are entirely black.

38. L. l ù g e n s, elongata nigra, opaca, capite thoraceque confertissime punctatis, pube brevi erecta parce vestitis, hoc latitudine longiore antrorsum sensim angustato, lateribus late rotundatis, ante basin transversim vix sulcato, angulis posticis paulo prominulis, elytris thorace latioribus, humeris subelevatis a basi postice paulo angustatis, postice dehiscentibus, et ad suturam rotundatis, angulo externo distincto, antice fortiter, postice subtilius punctatis, antennis corpore paulo brevioribus. Long. ·42.

Shoalwater Bay, Dr. Cooper. This species might be placed near L. n i g r e l l a, but the posterior angles of the thorax are hardly visible, the humeral parts of the elytra are more prominent, the elytra are more dehiscent and the sutural angle altogether rounded.

39. Syneta s u t u r a l i s, fusca, capite thoraceque dense rude punctatis, hoc lateribus bisinuatis, ad medium unidentatis, antice posticeque margine lato pallido ornato, elytris albis, sutura infuscata, seriatim punctatis, anguste marginatis, costis duabus parum elevatis intermediaque vix distincta, antennis, ore pedibusque pallide testaceis. Long. ·23.

Puget Sound, Mr. Davidson. A very distinct little species, with only a single lateral thoracic tooth.

40. Syneta seriata, testacea, capite thoraceque dense fortiter punctatis, hoc lateribus bisinuatis, medio obtuse lobatis, elytris seriatim punctatis, anguste marginatis, lineis duabus internis parum distinctis, externa paulo elevata. Long. ·20.

California, Mr. Rathvon. Also quite distinct: there is no conspicuous lateral tooth.

41. Anoplitis quadrata, (*Hispa quadrata* Fabr.) A specimen from California, not differing perceptibly from those found in Pennsylvania, was given me by Mr. Rathvon.

42. Galleruca angularis, supra ochrea, dense pubescens, haud subtiliter dense punctata, thorace inæquali, latitudine fere duplo breviore, antice posticeque transversim impresso, canaliculato, lateribus obliquis rotundatis, basi sinuata, angulis posticis acutis prominulis, elytris vitta laterali infuscata, guttisque parvis remotis serie triplici ornatis, subtus nigra, pedibus flavis, antennis fuscis. Long. ·22.

California, Mr. Rathvon. Allied to G. guttulata, but differs by the form of the thorax and by the black elytral dots being arranged in series.

43. Coccinella lacustris *Lec.* Puget Sound, Mr. Davidson.

44. Chilochorus pleuralis, hemisphericus, niger, subtiliter punctulatus, elytris macula rubra magna rotundata ante medium signatis, epipleuris ante medium late rufo-marginatis, parapleuris rufis. Long. ·26.

California, Mr. Rathvon. Larger than C. bivulnerus and C. fraternus, and differing from both, not only by the red spot being situated before the middle of the elytron, but by the abdomen being entirely black.

On motion, it was resolved that a committee of five be appointed to take measures for the formation of a permanent fund for the purposes of the Academy, and that the plan adopted by them be reported to the Academy for approval at the next meeting for business.

March 1st.

Vice-President BRIDGES in the Chair.

Fifty-four members present.

Dr. Robert E. Rogers exhibited Richie's modification of the Rühmkorff induction apparatus, and the modification of the ordinary electrical machine, by Prof. Wagner, of Vienna; in the original machine a large circle of wire carefully insulated is attached to the prime conductor; Dr. Rogers replaced this by hollow globes of glass silvered on the inside, and showed that the power of the machine was thus greatly increased.

On leave granted, the report of the Biological Department of the last month was read and ordered to be printed.

March 8th.

DR. HAYS in the Chair.

Thirty-five members present.

A specimen of Lepidosteus bison, taken at Bombay Hook, on the Delaware River, was presented by Mr. Andrew Vanderslice.

[March,

March 15*th.*

Vice-President BRIDGES in the Chair.

Fifty members present.

The following were presented for publication in the Proceedings:

Notes on Coluber c a l l i g a s t e r *Say*, and description of new species of Serpents in the collection of the North-western University of Evanston, Ill. By R. Kennicott.

Ichthyological Notices. By Charles Girard, M. D.

And were referred to Committees.

The Proceedings of the Academy for February was laid on the table by the Committee.

Mr. Foulke announced the death, at Rome, on the 13th ult., of Charles F. Beck, M. D., late a member of the Academy.

March 22*d.*

Vice-President BRIDGES in the Chair.

Forty-four members present.

The following was presented for publication in the Proceedings:

Catalogue of Birds collected on the rivers Camma and Ogobai, Western Africa by Mr. P. Duchaillu, in 1858, with notes and descriptions of new species. By John Cassin.

And was referred to a Committee.

Dr. Leidy called the attention of the members to the tooth of the *Mastodon*, from Tambla, Honduras, presented by Capt. J. M. Dow, this evening. It is a last superior molar, and presents a greater degree of developement of the intervening accessory lobes of the crown than is usual in the teeth of *Mastodon ohioticus*, but it nevertheless most probably belongs to the same species.

Dr. L. then directed attention to the fine collection of teeth and fragments of jaws of *Mosasaurus*, from the Green Sand of Monmouth Co., New Jersey, presented by Mr. J. H. Slack, and other gentlemen through him. The specimens illustrate, in a striking manner, the mode of development and succession of the teeth, noticed some time since in the Proceedings, (1857, p. 176). The specimens further exhibit variations in form and size, though obtained from the same individual. The teeth, with conical crowns and polyhedral sides, are those usually viewed as characteristic of *Mosasaurus*. Others had been referred to the genus *Geosaurus;* and such as were much compressed with trenchant borders, and without planes, were viewed as characteristic of the genus *Leiodon*.

The large humerus, presented by Mr. M. P. Rue, through Mr. Slack, was not found in the same marl pit as the *Mosasaurus*, though in the same formation not far distant. It bears a strong resemblance in form and size to the corresponding bone of *Hadrosaurus*, though presenting sufficient anatomical difference to belong to another genus. It perhaps belongs to *Mosasaurus;* the bones of the extremities of this animal yet remaining unknown.

Dr. L. added he was inclined to suspect that all the remains of *Mosasaurus* hitherto discovered in America belonged to one species, at least there appears insufficient evidence to separate them. Perhaps, however, the remains of the *Mosasaurus*, discovered in the green sand of the western portion of the continent, may indicate a different species from those obtained from the eastern portion.

Synonymy of the American Mosasaurus,

1. FROM THE EASTERN PORTION OF THE CONTINENT.

Saurian, resembling the reptile of Maestricht. Mitchell: Obs. Geol. N. Am. 1818, 384, pl. viii. fig. 4.

Mosasaurus. Dekay: Ann. Lyc. Nat. Hist. N. Y. 1828—36, iii. 135. Morton: Am. Jour. Sci. 1830, xviii. 246; Syn. Org. Rem. 1834, 27. Harlan: Trans. Geol. Soc. 1835, 81; Med. Phys. Res. 1835, 285. Emmons: N. Car. Geol. Surv. 1858, 217.

Geosaurus Mitchelli. Dekay: Ann. Lyc. Nat. Hist. 1828—36, iii. 138. Harlan: Trans. Geol. Soc. 1835, 82; Med. Phys. Res. 1835, 285; Edinb. Phil. Jour. 1834, xviii. 32. Pictet: Palæont. 1853, i. 506.

Geosaurus. Morton: Am. Jour. Sci. 1830, xviii. 246, Syn. Org. Rem. 1834, 28.

Saurian reptile, or Maestricht monitor. Harlan: Jour. Acad. Nat. Sci. 1825, 235; Trans. Geol. Soc. 1835, 81; Med. Phys. Res. 285, 384.

Mosasaurus Dekayi. Bronn: Leth. Geog. 1838, ii. 760. Gibbes: Smiths. Contrib. 1858, 8. Pictet: Palæont. 1853, i. 505.

Mosasaurus occidentalis. Morton: Proc. Acad. Nat. Sci. 1844, 133.

Mosasaurus Camperi or *M. Hofmani.* In part of Pictet: Palæont. 1845, ii. 64.

Atlantochelys Mortoni. Agassiz: Proc. Acad. Nat. Sci. 1849, 169.

Mosasaurus minor; M. Couperi; and *M. carolinensis.* Gibbes: Smiths. Contrib. 1850.

Mosasaurus Maximiliani. Pictet, in part: Palæont. 1853, i. 505. Emmons: N. Car. Geol. Surv. 1858, 217.

Mosasaurus Mitchelli. The name which according to usage should be adopted, if the eastern is a distinct species from the western one.

2. FROM THE WESTERN PORTION OF THE CONTINENT.

Ichthyosaurus missouriensis. Harlan: Trans. Am. Phil. Soc. 1834, 405; Tr. Geol. Soc. 1835, 80; Med. Phys. Res. 1835, 284, 344.

Batrachiosaurus. Harlan: Lond. Edinb. Phil. Mag. 1839, xiv. 302.

Batrachotherium. Harlan: Bul. Soc. Geol. 1839, x. 90.

Batrachiosaurus missouriensis. Von Meyer: Jahrb. Min 1845, 313.

Mosasaurus Neovidii. Von Meyer: Jahrb. Min. 1845, 312. Pictet: Palæont. 1853, i. 505.

Mosasaurus Maximiliani. Goldfuss: Nov. Act. Acad. Leop. Nat. Cur. 1845, xxi. 179; Jahrb. Min 1847, 122. In part of Pictet: Palæont. 1853, i. 505.

Mosasaurus missouriensis. Leidy: Proc. Acad. Nat. Sci. 1857, 90. This name, according to usage, is the one to be adopted for the western species, if distinct from the eastern one.

Dr. Bridges announced the decease, at Charleston, S. C., on the 16th inst., of Dr. Thos. D. Mütter, late a member of the Academy. Dr. Mütter was elected in 1833, and at one time held the office of Recording Secretary of the Academy.

On leave granted, a vote of thanks was tendered to Mr. M. P. Rue, of Perrinesville, N. Jersey, for the valuable donation of fossils presented by him this evening.

[March,

March 29th.

MR. LEA, President, in the Chair.

Fifty members present.

The Report of the Proceedings of the Biological Department for the present month was read.

The paper read before the Biological Department, entitled "On Suppuration in Cancerous Growths, by J. J. Woodward, M. D.," was recommended for publication in a Medical Journal.

On report of the respective Committees the following were ordered to be printed in the Proceedings:

Observations on the Species of Nicotiana.

BY JOHN LE CONTE.

"Planta beata, decus terrarum, munus Olympi,
Dissipat ignavum cerebro veternum,
Ingenium illustrat, si quando aut multa tenebras
Colligit ingluvies cerebro, aut molimine longo
Intellectus hiat, rerum neque concipit umbras,
Conceptasve tenet, vel cæca oblivia regnant,
Ut semel irrepit blando lux indita fumo,
Anfugiunt nubes atræ, curæque tenaces,
Vis micat inventrix, dato velut obice veli
Tota oculis animi patet, ampli machina mundi.

Tappius Orat. de Tubaco.

Among the extraordinary usages and customs which have been adopted by man, and which have become nearly universal, none is more so than the use of tobacco. That a plant, the first taste of which is so extremely nauseous, and the effects produced by it so highly disagreeable, should become over the whole habitable world an indispensable article of enjoyment, may well strike us with wonder. Other plants for their exciting or intoxicating properties have always been in use; for instance, the poppy, hemp and the *Amanita muscaria* but tobacco never produced these effects; rather the contrary, it soothes and indeed stupifies, when not taken in excess. When a sufficient quantity is taken to act with its full power on the animal economy, the feelings produced are most unqualifiedly disagreeable and annoying, nausea, vertigo, cold perspirations, palpitation of the heart, and a sensation which must be very much like the approach of death. Other narcotics, as opium and the extract of hemp, produce nothing but the most pleasing emotions. What then has induced man to adopt the use of this plant so opposite in its qualities? The answer is contained in the verses placed at the head of this paper, for the effects there described are truly what arise from the temperate use of tobacco. Whether the use of any species of this plant, or of others having similar properties, was known to the ancients, is a question hard to be resolved. All that I can collect on this subject follows: Herodotus (Klio, 202) says of the Skythi, that "they take the berries of a certain tree, kindle a fire, and assemble around it in parties, and then throw these berries on the fire, inhale the smoke, and intoxicate themselves with the smell, in the same manner the Greeks do with wine; the more fruit they throw on, the more intoxicated they get, until they rise up to dance and proceed to sing." He says they likewise purify themselves after a funeral in the following manner. "They make a close tent of felt blankets, with a vase filled with red hot stones placed in it. Then taking some hemp seed, creep in under the blankets and scatter it on the red hot stones, and produce such a vapor as no Grecian stove can. Delighted with the effect produced, they utter loud howlings; this stands them instead of a bath, for they never by any chance wash their bodies in water." In this respect they resemble our American Indians, and must have

been as filthy in their habits. The women it appears removed the smell of the dirt, with which they were habitually covered, by the application of a perfumed paste. Solinus, cap. x. § 5, informs us that the Thrakes occasion a kind of ebrious excitement by burning the seeds of plants which they possess, and inhaling the smoke. Pomponius Mela, lib. II. cap. II. § 35, has very nearly the same words. Strabo, however, lib. VII. alluding to a similar custom, calls those who make use of this method of excitement Καπνοβίται or livers in smoke, or more properly as appears from other copies of his work, Καπνσπάται smoke walkers. The first three authors allude to the use of hemp; whether they did not put the dried leaves of this plant into pipes, as Strabo's men from the name he gives them probably did, we cannot now determine. It is certain that pipes have been found buried at great depths in the earth, where they could not have been placed within four hundred years. Dioscorides, in his treatise on materia medica, lib. III. cap. 126, says, that the dried leaves of *Tusselago farfara*, set on fire and the smoke drawn through a tube (*infundibulum*) and received into the mouth, will cure those who are suffering under a dry cough or orthopnœa. Caius Plinius, lib. XXVI. cap 16, recommends the same, and in the preceding chapter 15, the *Hyoscyamus niger*. Here are instances of smoking the leaves of plants, from tubes or pipes.

It is generally believed that tobacco was not known in Europe previously to the discovery of America. Yet one of the species known, and commonly cultivated in Europe and Asia, is never seen in this country except as a curiosity in botanic gardens. America was discovered in 1492. If the use of this herb was not known out of our country before this date, it is certainly inconceivable that in a few years after the time of Columbus, a little more than one hundred, the smoking, chewing and snuffing of tobacco should have spread through the habitable world, extended to the remotest districts of Africa, to India and to China, where nations are so averse to introduce any innovation in their customs. But when we come to consider that there is one species peculiar to Europe and Asia, another to Africa, and a third to America, I do not think that it will be difficult to suppose that it may have been in use in the remotest ages. Here follows all that I have been able to collect on this subject. None of the older travellers in thirteenth, fourteenth and fifteenth centuries, as Marco Polo, Pegoletto and Clavigo, in 1403, and the Portuguese voyagers, Vasco de Gama, Alvarez, Cabral and Pacheco, about 1500, mention having seen it used; Postel, Belon and Burbeck, Caspar Balby, John Newberry and Rauwolf, about a hundred years after, are equally silent with regard to the custom. Keeling is the first traveller whom I can find observing its use, this was in 1507. Kæmpfer in 1560, and Isbrand Ides in 1692, say that its use was universal in China, both among men and women. In the year 1607, according to the observations of Mr. Fitch in his voyaye to Sierra Leone, the negroes there cultivated tobacco, which he says appears to be half their food. According to Bosman in 1700, all the inland negroes used to cultivate tobacco, and from the description which he gives of the leaf, it appears to have been the same species as that formerly cultivated by the Spaniards in Cuba and South America.

Tobacco was first imported into France from Brazil, by Andrew Thevet, historian and Cosmographer to the king, in 1558. He says in his work, "France Antarctique," that the natives carefully gather the herb and dry it in the shade of their little cabins. The manner of using it is this; after drying it, they wrap a quantity of the herb in a very large palm leaf, and roll it to the size of a candle, then putting fire to one end receive the smoke of it by the nose and mouth. It is pretended that Raleigh introduced it into England in 1584, but this is not true. To John Nicot belongs the credit of having first actually introduced the use of it into France. It appears that he obtained the seed of it in Portugal, whither it was said to have been brought from Florida. John Nicot was an ambassador from France to the Portuguese court, during the reign of Charles the Ninth. When he sent the seed of this plant to France, he

[March,

accompanied it with a small box of snuff, in the use of which Queen Catharine de Medici took such pleasure, that it soon became popular and fashionable. Thus much for its early history.

Tobacco, at all times, has had its detractors and its defenders; theologians and physicians have striven to eradicate its use, or to defend it as a perfectly harmless ingredient, in the pleasant employment of time. The number of publications for and against it has been truly enormous, but those who take the contrary part have been more distinguished by their extraordinary exaggerations and barefaced falsehoods, than by any just reasoning on the subject. It would be out of place here, to more than allude to the literary compositions of this nature, particularly those of an early date, at the head of which stands the Misocapnus of James the First, of England. Modern writers, even of our own times, are not wanting, who have not hesitated to invent the most flagrant falsehoods about the use of a substance, which, at the worst, involved only a small loss of time and of money. One has said that the decline of certain nations, the Chinese and Turks, must be attributed to the use of this plant. Others (calling themselves Doctors in Medicine,) have attributed almost every disease that afflicts humanity to this propensity. The great mortality attending Asiatic cholera has been ascribed to it. The enemies of alcohol, of tea and of coffee, all combine in a warfare against tobacco. They invent the most ridiculous stories to bring these articles into disrepute. Some have had the folly to say that leeches have been instantly killed when applied to those who used tobacco, and that bugs and fleas would not bite such persons. One Dr. Long, of New Hampshire, states that he was consulted by a Mrs. F., "on account of her daughter, who had a small ring-worm at the tip of her nose; she wished to apply tobacco to it." The Doctor objected, and related to her a story, probably of his own extemporary fabrication, of a father "who had destroyed his little son by the application of tobacco spittle to an eruption on his head." The good woman did not believe the doctor, and when he was gone besmeared the tip of her finger with some of the juice from the grandmother's pipe, and applied it to the ring-worm; the instant the mother's finger touched the part affected, "the eyes of the little girl rolled up in their sockets, she *sallied* back, and was prevented from falling by the alarmed mother." The child was then attacked by trismus and deep insensibility; she was, however, restored by the application of ammonia and lavender. "Till this time," says the Doctor, "the child had been robust and healthy, never having had but one illness that required medical advice, but since the tobacco experiment, has been continually feeble and sickly. The first four or five years after this terrible operation, she was subject to fainting fits every three or four weeks, lasting from twelve to twenty-four hours. Within the last three or four years these *turns* have been less severe."

In the first years of the introduction of tobacco into general use, laws were passed against it, chiefly, I presume, because it was looked upon as possessing intoxicating properties. Amurath, the IV., Sultan of Turkey, finding it impossible, himself, to learn to smoke, issued a violent decree against its use. Those convicted of being snuff-takers or smokers, were condemned to receive fifty blows of a cane on the soles of their feet, and on a repetition of the offence, to lose their noses. The same punishments for using tobacco were inflicted by Michael Fédérowich, in Russia, which law was in force until the accession of Peter the Great. Tavernier relates that, Sefi, king of Persia, punished those who were caught smoking by pouring melted lead into their mouths until they were dead. Chardin tells us the following anecdote of King Abbas, the grandfather of Sefi:—Having tried without success to prevent the use of tobacco, the smoke of which was offensive to him, and in order to punish his courtiers who used it, at the end of a sumptuous banquet which he had given them, he offered them pipes filled with dry horse dung instead of tobacco. From time to time his majesty asked them how they liked the tobacco; they all declared that nothing could be more delicious; it possessed the perfume of a thousand

flowers. The king looking at them with indignation, exclaimed, Cursed be the drug which cannot be distinguished from horse dung.

The fanatics who first colonized New England, and who wished to make mere animated statues of their fellow creatures, could not resist the opportunity of putting a restraint upon this innocent enjoyment. They therefore ordered "that no man shall take any tobacco publicly in the street, highway, or in any barn-yards, or upon training days, or in any open places," under the penalty of six-pence for each offence. I might fill pages with similar relations, and with accounts of attacks made upon this favorite weed, but I forbear.

I have used tobacco for more than sixty years without perceiving any ill effects produced by it. I was once induced to abandon it for about six months, but this disuse brought on numerous and painful ulcers of the tongue, which promptly vanished on resuming its use.

I have never observed it to have any exciting effects on the body or mind, but on the contrary, its action appears to be entirely soothing and sedative. Let a person overwhelmed with fatigue of body and mind set himself down in an easy posture, light his segar or pipe, and cease to think; by the time his *fumets* is burnt out, he will find himself entirely relieved from his fatigue, with mind refreshed, and body strengthened. Drs. Pereira and Christison, say they have never known any well ascertained ill effects having been produced by the habitual practice of smoking.

The great variety of tobacco met with in commerce, differing in color, in flavor, and in strength, does not depend upon a difference in species or variety, but almost entirely on the soil in which it has grown, in the method of curing it, and the adulterations which it undergoes in passing through the hands of unscrupulous dealers. Thus manured land never produces the plant of the first quality; for this purpose, a virgin soil, very rich and strong, with but little calcareous matter is required. This, however, will not endure for a longer space than six years: it gradually deteriorates, until at last it is entirely worn out, and cannot be brought back to its original state by the application of manure. This always renders it disagreeably strong, and highly impregnated with nitre. Calcareous soils produce these same effects, and thus the tobacco of our Western States is inferior to the Virginian, and may easily be known by a saline taste. If tobacco be cured without the use of artificial heat, its fine flavor is better preserved, and its color more uniform. Again, if dried with little exposure to the air, it becomes of a bright yellow color. The best tobacco for smoking comes to us from the tropics, possessed of a peculiar flavor and perfume; this was once the case with all the segars brought from Cuba. At present, those that are introduced into the United States from that island are adulterated with tobacco of an inferior kind; they are not at all like those brought fifty years ago. Either the plant has deteriorated by mixing with other species, or is so adulterated by a mixture with the common tobacco of our country, that the true flavor is entirely lost. Vessels loaded with tobacco, the produce of our own soil, are constantly leaving our shores for the port of Havanna. Besides, large quantities of an inferior quality produced from imported seed are now sent from New England, and either used there or brought back and sold here as genuine Havanna. The last good tobacco that I have smoked was made by myself in Georgia, about thirty years ago. This possessed the delightful perfume peculiar to the best raised within the tropics; it was at the same time very mild and burnt freely. There is, however, much imagination in the judgment which we form of tobacco.

I might here point out the method by which deleterious substances are mixed with tobacco, and how the leaves of various other plants are substituted for it. Some of the most extensively used manufactured tobacco has poisonous drugs mixed with it, which increase its action on the system, particularly on the brain, in such a degree as to become really dangerous. Those persons, therefore, who use it for a masticatory, would do well to employ no other than the pure leaves

as they are brought from Virginia. Almost all the pressed tobacco is defiled with liquorice or molasses, which substances conceal the bad taste of the inferior qualities. The method by which the flavor of our plant is imparted to plants which have none of their own is as follows:—A quantity of the refuse tobacco is boiled in wine, or more frequently in human urine, until a strong fluid extract is obtained; to this some salt is added. It is then poured upon the dried leaves of other plants, such as rhubarb, burdock, sunflower, cabbage, or broad-leaved dock, which, after remaining in the fluid a sufficient time to absorb as much of it as they can contain, are hung up to dry and then made into Havanna segars. Cut tobacco, likewise intended for smoking, is mixed with the leaves of stramonium and foxglove and with opium. There is, however, no end to the dishonesties practised by tobacco manufacturers.

I now proceed to describe the plant as it has come under my observation, premising that I do not believe that the species here noted are any where to be found in a perfectly wild or native state. Mr. Lehman, the last authority on this subject, enumerates twenty-one species. I have seen but four, and one of these looks very much like some other genus. I allude to *N. quadrivalvis*. The other species of *Nicotiana* have but two valves in the capsules. The three remaining species, I know from experience, mutually mix together. I omit a description of the genus.

NICOTIANA TABACUM. Annual, viscid, branching. Leaves oblong lanceolate, broad, acuminate, most entire, for the most part strictly sessile, at the base more or less decurrent, subamplexicaul. Flowers paniculately corymbose, terminal, with linear lanceolate bractes. Calyx oblong, five-cleft, the divisions lanceolate acute. Corolla infundibuliform, much longer than the calyx, the tube viscid, greenish, the limb pale rosy, spreading, the lobes ovate acute, capsule a little longer than the calyx, stigma transversely sulcate on the top.

This is the common tobacco of commerce, called by different names, Virginian, Kentucky, Nagadoches, &c. It is not agreeable to smoke, unless weakened by washing in water. It is the only kind fit for chewing. Too much care cannot be taken in the operation of curing it, and much of its goodness depends upon the manner in which it has been dried and fermented. The Indians in this country are in the habit of mixing it with the leaves of *Rhus glabrum* and *Laurus Borbonia*, or the scraped bark of *Cornus sanguinea*, all of which improve its taste in a remarkable degree.

N. FRUTICOSA. Perennial, pubescent, viscid, branching. Leaves lanceolate, acuminate, most entire, sometimes very shortly petiolate, most generally sessile, the lower ones amplexicaul. The inflorescnce the same as of the preceding, stigma subbilobate.

This is the far-famed tobacco of the Island of Cuba and of all the tropical parts of America. I have been told that it is the species cultivated in the interior of Africa. It is probably indigenous to that portion of the globe. An African, from a region in that country far distant from the sea, who was well acquainted with the cultivation of the plant in his own country as well as in this, told me when he first saw this species growiug in Georgia, that it was the kind which grew in his country. He could not well be mistaken, for the leaves of *N. tabacum* are very wide, whilst on the contrary of the *N. fruticosa* they are rather narrow. It is from this species that the so-called Havanna segars ought to be made. But it seems to me that very little of it enters into the composition of what we now receive from Cuba.

N. RUSTICA. Annual, villous, viscid, branching. Leaves petiolate, ovate or roundish obtuse most entire, sometimes more or less cordate, divisions of the calyx short, ovate or roundish. Corolla greenish yellow. Stigma entire.

From this species, which is nearly as agreeable for smoking as the last, are produced the varieties called Turkish, Chinese, East Indian, Shirazian and Latakia tobacco. It is said to have been imported from America into England

in the year 1578, and yet has never been seen here except cultivated as a curiosity in gardens, the seed being always brought from China. It must be considered as a species confined originally to the older continents and not known on this side of the Atlantic, until after the discoveries of Columbus and others. I think that I have seen it growing in a quasi indigenous state on the road sides in Europe. No tobacco has ever been seen growing without cultivation in the United States. This circumstance taking place with most of our cultivated vegetables is a certain proof of their having been imported from some other country.

As has been observed before, these three species will mix together in every possible degree, hence the great number of species which appear in our books. If we take the trouble to analyse these, it can easily be perceived that they have been produced by hybrid intermixtures, unless fertile hybrids are to be considered as valid species. All those which resemble the *N. tabacum*, but with narrower leaves than common, or in any degree possessed of the peculiar characteristics of the *N. fruticosa*, have been produced by the mixture with this species, and all those with leaves more or less petiolate, whether lanceolate or ovate, as formed by a combination of *N. tabacum*, *N. fruticosa* and *N. rustica*. It is remarkable what strange appearances these will put on; every possible variation of the principal forms and every gradation of position will be found, all, however, easily reducible to the three original types.

Notes on COLUBER CALLIGASTER of Say, and a description of new species of Serpents in the collection of the North Western University of Evanston, Ill.*

BY R. KENNICOTT.

Eutænia Sackenii Kennicott.

Sp. ch.—Very slender; tail forming one third of the total length. Crown more elevated and convex anteriorly than in *E. saurita*. Nineteen dorsal rows of scales. Color olive black above, not lighter below the lateral stripe. Lateral stripe greenish yellow, very narrow on the third and fourth lateral rows. No dorsal stripe. Abdomen uniform greenish.

In form, this closely resembles *E. saurita*, but is at once distinguished by the absence of the dorsal stripe, of which there is no trace, except for about a half inch behind the head. The color of the upper parts is also much darker, and the first two rows of scales below the dorsal stripe are not lighter than above it. Florida.—Baron Osten Sacken.

Scotophis calligaster.

Coluber calligaster Say, in Long's Exped.

Sp. ch.—Head very narrow, elongated, much wider behind; nose very obtuse, the whole outline subquadrangular; much elevated anteriorly, as high as wide before the eyes, flattened and rather depressed on the occiput. Eye large. Vertical plate narrow, much longer than wide, tapering but little behind. Superciliaries very narrow. Postfrontals and loral large. Twenty-seven dorsal rows of scales, only the central carinated, and these very faintly. Ground color olivaceous white; a dorsal series of transverse brown blotches separated by narrower intervals than in *S. Emoryi*, B. & G., with two smaller series on each side. Temporal light stripe, narrower than in *S. Emoryi*. A brown blotch under the eye, and another on the second and third upper labials. Labials not margined with black.

This is very closely allied to *S. Emoryi*, from which it differs in having the head narrower posteriorly, with a more obtuse snout, smaller vertical, narrower

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* Specimens of these species are also in the Museum of the Smithsonian Institution, Washington.

superciliaries, larger loral, narrower intervals between the dorsal blotches, which are themselves less rounded, narrower light temporal stripe, etc. From *S. guttatus*, it may be readily distinguished by the color, transverse dorsal blotches, etc.; and from the other species of the genus it differs in much the same points with *S. Emoryi*. There can be no hesitation in referring this species to the *Coluber calligaster* of Say. The very faint carinations of the central dorsal scales might easily be overlooked. Like *S. Emoryi*, it bears a strong general resemblance to *Ophibolus eximius*, to which species Say's description has been referred by Dr. Holbrook, and others; but from this and *O. Evansii*, it may at once be distinguished by the large eye, elongated head, divided postabdominal scutella, carinated scales, and other generic characters.

Hyatt, Anderson Co., Kansas, Mr. Samuel Arny.

OPHIBOLUS EVANSII Kennicott.

Ophibolus Evansii Kennicott, Rep. of Mex. Boundary Survey.

Sp. ch.—Light olivaceous brown or gray, with a dorsal series of about sixty subquadrangular emarginate dark chestnut brown blotches from head to tip of tail, and two smaller lateral series on each side. Dorsal scales in twenty-five rows.

This is most nearly allied to *O. eximius*, but differs strikingly in the number of dorsal rows of scales,—twenty-five instead of twenty-one; also in having a more elongated, narrow and elevated head, narrower snout, anterior and posterior emarginations in the dorsal blotches, etc.

Prairies of Central Illinois, S. H. Roots, C. Mills, S. W. Arnold.

The species is dedicated to Prof. J. Evans, to whose interest in the investigation of the zoology of the north west, the N. W. University is principally indebted for the large collections of animals made under its auspices.

DIADOPHIS ARNYI Kennicott.

Sp. ch.—Form slender, though less so than in *D. docilis*. Body above uniform leaden black, the crown scarcely darker; abdomen yellow, thickly and irregularly spotted with black, the spots more numerous than in *D. docilis*, and extending to some distance behind the anus; head beneath thickly mottled with black spots of much smaller size than those on the abdomen. A narrow light yellow occipital ring, one to one and a half scales wide. Dorsal scales in seventeen rows.

Resembles *D. docilis*, from which it will be distinguished by the color, shorter body, narrower head, spots under the tail, and narrower occipital ring; from *D. regalis* by its occipital ring, and from the other species by the number of dorsal rows.

Hyatt, Anderson Co., Kansas.—Samuel Arny.

VIRGINIA ELEGANS Kennicott.

Sp. ch.—Resembles *V. valeriæ*; vertical and occipital plates narrower. Dorsal scales very narrow and elongated, much more so than in *V. valeriæ*, disposed in 17 rows. Color uniform light olivaceous brown above; dull yellowish-white beneath.

Readily distinguished from the nearly allied *V. valeriæ* by the narrower dorsal scales in 17 rows instead of 15 as in that species.

Heavily timbered regions of southern Illinois.—Dr. Hugh McVean, J. W. Waugh.

CELUTA VERMIS Kennicott.

Sp. ch.—Larger than *C. amœna* and *C. Helenæ*. Two pairs of frontal plates. Color above lustrous purplish black, much darker than in *C. amœna*. Abdomen pale yellowish flesh color, (probably brighter in life); this color extending to the third lateral row of dorsal scales.

Though possessing the general form of *C. amœna*, this differs strikingly in the

larger size, darker color of the upper parts, and the extension of the flesh color of the abdomen over to the third lateral row of scales; in *C. amœna* this color extends only to the second row.

Missouri,—Dr. P. R. Hoy

CELUTA HELENÆ Kennicott.

Sp. ch.—Snout shorter and narrower than in *C. amœna*. A single pair of frontal plates. Color above lustreus chestnut brown; beneath pale yellowish, (flesh color in life) color of the abdomen extending to second lateral row of dorsal scales.

Readily distinguishable by the suppression of the anterior frontals.

Monticello, Miss., Miss Helen Teunison; Southern Illinois (abundant in the woods), Dr. H. McVean, Robt. Gow, C. Thomas, L. W. Ashley.

ICHTHYOLOGICAL NOTICES.

BY CHARLES GIRARD, M. D.

XXVIII. The genus *Hadropterus* is represented in the waters of the Potomac River by a species, the average size of which is three inches in total length. Its body is subfusiform, compressed, thickest anteriorly and tapering gradually towards the peduncle of the tail, which is slightly contracted. The head enters four times and a half in the total length. The posterior extremity of the maxillar bone corresponds to a vertical line intersecting the anterior rim of the orbit. The eye is subcircular and well developed; its diameter entering about four times in the length of the side of the head; once in advance of its anterior rim. The first dorsal fin is lower and much longer than the second, to which it is contiguous. The posterior margin of the caudal fin is subcrescentic. The anal fin is situated exactly opposite the second dorsal and corresponds to it in extent, but differs from it by its external margin, which is more convex, giving the entire fin a more ovate outline. The ventrals and the pectorals are moderate sized, the former being sublanceolar, the latter subelliptical in their outline. The rays are:—D XIV; 14; A II, 10; C 6, 1, 8, 8, 1, 5; V I, 5; P 14.—The scales are small, longer than deep and very finely pectinated upon their posterior margin. The lateral line constitutes the eighth row of scales, counted from the first dorsal fin. The ground color is yellowish brown; the dorsal region being maculated with chestnut brown; whilst a series of rather large, rounded, blackish blotches occupy the middle of the flanks; a black vertical streak intersects the orbit. The second dorsal and the caudal fins are transversely barred with blackish. The other fins are unicolor, except the first dorsal, which exhibits small black spots close to the rays, below the middle of their height, more conspicuous anteriorly than posteriorly.

The species here referred to we will record under the name of *H. maculatus;* the specimens examined were caught in an eastern tributary of the Potomac River, in Anne Arundel Co. Md.

XXIX. Another species of *Hadropterus* was collected in the Arkansas River, near Fort Smith, by Dr. George G. Shumard. We propose to call it *H. shumardi.* It will always be easy to distinguish it from its congeners by the great development of the anal fin, which is much larger than the second dorsal and projects much further back. The body is elongated, rather slender, although tapering but little backwards; its entire length is about two inches and a quarter, in which the head enters four times and a half. The first dorsal fin is longer than the second and nearly as high.—D XI; 13; A II, 11; C 6, 1, 8, 7, 1, 5; V I, 5; P 12.—The scales are rather small. The color is somewhat altered by the preserving fluid: an olivaceous tint appears to have existed over the dorsal region with darker spots or dots, whilst the abdominal region is rather whitish. The caudal fin exhibits transverse dark lines, and the first dorsal a black spot at its posterior portion; a dark vertical streak intersects also the orbit.

XXX. A representative of the Etheostomid family was procured by the U. S. and Mexican Boundary Commission, at the mouth of the Rio Grande del Norte (Rio Bravo). It constitutes a new generic type, allied to *Catonotus*, and to which we have applied the name of *Alvarius*, with the following characters: Head elongated and tapering; mouth terminal, large, not protractile, lower jaw longer than the upper. Teeth very minute, opercular apparatus, cheeks, and throat scaly. First dorsal fin nearly equal in height to the second, from which it is quite distinct. Anal fin much smaller than the second dorsal; caudal fin truncated. Five soft rays to the ventrals. Ventral scales uniform.

As to the species, its body is slender and elongated, the head being subconical and tapering forwards. The latter enters four times and a half in the total length. The eye is subelliptical; its horizontal diameter entering about four times in the length of the side of the head; once in advance of its anterior rim. The posterior extremity of the maxillar bone corresponds to a vertical line drawn in advance of the pupil. The first dorsal fin is subtriangular in its outline; its base is nearly equal to that of the second dorsal, from which it is separated by a small space. The anterior margin of the anal is situated somewhat behind the origin of the second dorsal; both fins terminating evenly. The ventrals and the pectorals are rather slender.—D VI; 10; A 8; C 5, 1, 6, 6, 1, 6; V 5; P 14.—The scales are very small, finely pectinated posteriorly; the lateral line being median. The ground color is light yellowish brown; the dorsal region being occasionally maculated, and the middle of the flanks provided with a narrow blackish streak which extends along the sides of the head to the apex of the snout. This lateral streak has suggested the appellation of *A. lateralis*, which we have bestowed upon this species. The fins are unicolor, except the caudal, which is transversally barred, and the first dorsal which exhibits a black spot at its upper and posterior edge. The largest specimens examined measure somewhat less than two inches in total length.

XXXI. A mere glimpse at the "*Ichthyologia ohiensis*" is sufficient to convince every impartial writer, that *Etheostoma blennioides* was never intended to typify the genus *Etheostoma*.* The latter is subdivided into two subgenera: *Aplesion*, in which the spinous and the soft portions of the dorsal fin are combined; and *Diplesion*, in which the same parts are distinctly separated. Now, *E. blennioides* falls immediately under the head of *Diplesion*.

Another species of the genus *Diplesion* inhabits the waters of Chihuahua river. Specimens of it were collected by Mr. John Potts, of Chihuahua, and sent to the Museum of the Smithsonian Institution. We call it *D. fasciatus*.

It has the same general blennioid aspect as its congener: the total length of the specimens observed, measuring about two inches and a quarter, the head entering in it four times and a half. The eye is of medium size, subcircular; its diameter being contained four times in the length of the side of the head. The first dorsal fin is lower and longer than the second, to which it is contiguous. The anal is well developed, rather deeper than the second dorsal, but shorter upon its base. The caudal fin is subtruncated. The ventrals and the pectorals are of moderate development; their tips being nearly even. The rays are;—D X; 12; A 1, 8; C 6, 1, 6, 6, 1, 6; V 1, 5; P 11.—The scales are small, deeper than long, posteriorly rounded off and minutely pectinated, whilst their anterior margin is truncated, exhibiting numerous radiating furrows upon the latter section only. Their imbrication takes place after the fashion of the sciænoids: instead of longitudinal series, they constitute transverse, oblique series. As to the coloration it is but imperfectly preserved. Transverse bands of deep chestnut brown alternate with white or yellowish ones. These bands, or fasciæ, are better defined below the lateral line than above it, where they are sometimes interrupted. The head is brown, with a vertical black streak across

* Amer. Journ. of Sci. and Arts. Second series. xvii. 1854, 305.

the orbits. The fins are yellowish, unicolor, except the first dorsal, which is margined with black. During life we imagine this fish to be one of the prettiest inhabitants of the fresh waters of this continent.

XXXII. To such species of the genus *Etheostoma*, in which the two dorsal fins are united, Rafinesque proposes to apply the name of *Aplesion*, as alluded to above. A species of the latter genus was collected with the preceding one by Mr. John Potts, in Chihuahua river and tributaries. Its body is rather short and deep, proportionally deeper than in the other genera of the family. The dorsal region is regularly convex from the occiput to the peduncle of the tail. The caudal fin is rounded off and fan-shaped. The spinous portion of the dorsal fin is nearly of the same height as the soft portion, but much longer and superiorly convex. The anal fin is smaller than the second dorsal. The ventrals are sublanceolated and the pectorals subelliptical in shape, rather small or moderate in development, the tip of the ventrals projecting somewhat further back than that of the pectorals, although not reaching the vent. The formula of the fins is as follows:—D x, 1, 10; A II, 7: C 4, 1, 6, 6, 1, 3; V I, 5; P 11.—The head, which forms about the fourth of the total length, is rounded upon the snout; the jaws being nearly equal, the gape of the mouth somewhat oblique, the posterior extremity of the maxillar bone extending to a vertical line which would intersect the pupil. The eye is circular; its diameter entering four times in the length of the side of the head, less than once in advance of its anterior rim. The opercular apparatus, cheeks and throat are bare. The scales are of moderate development deeper than long, very finely pectinated posteriorly, where rounded off, and provided with radiating furrows upon their anterior section. The color is of a uniform olivaceous brown tint, the dorsal fin rather darker than the rest. We propose to call this species *Aplesion potsii*, in remembrance of our esteemed friend from Chihuahua.

XXXIII. A species of *Oligocephalus*, closely allied to *O. lepidus* was collected in Devil's river, Texas, by John H. Clark, under Col. J. D. Graham. It may be distinguished from its congener just alluded to by a much larger anterior dorsal. The latter is nearly as high as the second dorsal and somewhat longer upon its base. The body is rather short and quite compressed; about two inches in total length, in which the head enters four times and a half. The tips of the ventrals are nearly even with those of the pectorals. The rays of the fins are:—D IX; 13; A II, 8; C 4, 1, 7, 6, 1, 3; V I, 5; P 12.—The scales are proportionally well developed; the nape is bare. The ground color is yellowish brown, with blackish brown blotches more distinct along the dorsal line than on the flanks. The second dorsal and caudal are transversely barred. The species we will record under the name of *Oligocephalus grahami*.

XXXIV. Another species still, of the same genus *Oligocephalus*, was collected in the Rio Leona, Texas, by the same party that secured the preceding one. We will designate it under the appellation of *O. leonensis*. It is a more slender fish than either *O. lepidus* or *O. grahami*, although not quite so elongated as *O. linslii*. The largest specimens observed measure about two inches in total length, in which the head enters four times and a half. The anterior dorsal fin is longer but somewhat lower than the second dorsal, and superiorly convex. The anal is well developed. The ventrals are small and spear-shaped, as well as the pectorals when in a semi-closed condition. The tips of the latter extend beyond those of the former, although very far from reaching the vent. The formula of the fins is as follows:—D IX; 10; A II, 7; C 6, 1, 6, 6, 1, 5; V I, 5; P 12.—The ground color is yellowish olive, maculated with black or brown. Second dorsal fin and caudal transversally barred.

XXXV. We have bestowed the name of *Oligocephalus pulchellus* upon a species collected in a tributary of Gypsum creek, which empties itself into the Canadian river, by the party under Lieut A. W. Whipple, while exploring the R. R. route along the 35th parallel. The only specimen preserved measures an inch

and a quarter, and in all probabilities not fully grown. The body is slender and subfusiform, quite compressed, deepest at the insertion of the ventrals, and tapering towards the base of the caudal. The head is slender, subconical, and rounded off anteriorly. The anterior undivided ray of the anal fin is quite large, and a good deal more conspicuous than the second one. There are but six articulated rays to that fin. The ground color is yellowish brown, maculated with black or blackish brown.

XXXVI. Specimens of a species of *Boleosoma* were collected by Dr. C. B. Kennerly, under Lieut. A. W. Whipple, in the Rio Seco, Texas, and in the Rio Leona, near Fort Inge, Texas. It is slender and graceful in general appearance, measuring an inch and three quarters in total length, in which the head enters about four times and a half. The first dorsal fin is longer and lower than the second, and superiorly convex. The anal is much deeper than long upon its base, and convex upon its edge. The tips of the ventral fins extend a little further back than those of the pectorals. The rays are as follows:—D x; 10; A 8; C 3, 1, 7, 7, 1, 3; V i, 5; P 13.—The ground color is olivaceous yellow, maculated with black or blackish brown. The second dorsal and the caudal fins being as usual transversally barred. A longitudinal black streak may be observed in advance of the orbits, and a vertical one beneath them. We call the species *Boleosoma gracile*.

XXXVII. Under the name of *Boleichthys* we have instituted a genus which is intermediate between *Boleosoma* and *Oligocephalus*. The head is subconical, tapering forwards, the jaws being nearly equal, hence the mouth is terminal, slightly protractile, and of moderate size. The opercular apparatus is scaly, whilst the cheeks and the throat are bare. The two dorsal fins are distinctly separated; the first being lower than the second. The anal is well developed, although somewhat smaller than the second dorsal. The caudal is subtruncate or subcrescentic.

The typical species of this genus was collected by Dr. Geo. Suckley, under Gov. I. I. Stevens, in Little Muddy river, a tributary of the Upper Missouri. It is a very slender fish, measuring an inch and three quarters in total length. The body is compressed, tapering towards the peduncle of the tail, which is slightly contracted. The head constitutes a little less than the fourth of the total length. The eye is large and subcircular, its diameter entering three times and a half in the length of the side of the head. The posterior extremity of the maxillar bone extends to a vertical line which would intersect the anterior rim of the pupil. The formula of the fins is as follows:—D x; 10; A ii, 8; C 3, 1, 6, 6, 1, 3; V i, 5; P 12.—The lateral line, from the orbit passes over the opercular apparatus, keeping nearer the dorsal than the abdominal line to the peduncle of the tail, hence midway to the insertion of the caudal, when it does not disappear before reaching it. The pectorals extend further back than the ventrals; the first dorsal is convex. The ground color is yellowish brown, maculated with greyish black. The dorsals and the caudal fin are transversally barred. A dark spot may be seen on the occipital region, and a streak in advance as well as beneath the orbit. We call the species *Boleichthys exilis*, on account of its slender appearance.

XXXVIII. A second species of *Boleichthys*, which we call *B. whipplii*, was collected in Coal creek, Arkansas, by the party under Lieut. A. W. Whipple. Its body is more compressed and proportionally deeper than in the foregoing species. The head constitutes a little less than the fourth of the total length, which is nearly two inches. The first dorsal fin is convex in its outline. The ventrals extend further back than the pectorals. The rays of the fins are:—D ix; 13; A ii, 8; C 2, 1, 8, 7, 1, 3; V i, 5; P 12.—The scales are rather small, smaller than in the preceding species, and the lateral line is but slightly nearer the dorsal than the ventral line. The ground color is reddish brown, inconspicuously maculated; a black spot may be observed at the scapular region. The second dorsal and the caudal fins are transversally barred.

XXXIX. Specimens of a rather short and deep bodied species of *Boleichthys* were collected at Piedrapainte, Texas, by John H. Clark, under Col. J. D. Graham, while connected with the U. S. and Mexican Boundary Survey. We call it *B. elegans*. The first dorsal fin is longer than the second, and the pectorals extend further back than the ventrals. The formula of the fins is as follows:—D x; 12; A II, 8; C 2, 1, 7, 6, 1, 3; V I, 5; P 12.—The scales are of medium size, and larger than in the preceding two species. The ground color is olivaceous brown, maculated with blackish brown.

XL. In the collections made during the "Exploration of the Upper Missour and Yellowstone," under Lieut. G. K. Warren, there is a species of *Boleichthys* resembling more *B. exilis* than any other of its congeners, by the shape of its body and general appearance. It differs, however, from the species just alluded to, by a more compact body, a proportionally shorter head, smaller scales, and the structure of the fins, the rays of which are as follows:—D IX; 11; A II, 9; C 3, 1, 8, 7, 1, 4; V I 5; P 13.—The ground color is yellowish brown, the middle of the flanks being maculated with transverse spots of blackish; the belly exhibiting a rather orange hue. The first dorsal has a series of vertically elongated black spots resembling a dark band across the middle of that fin. The second dorsal and caudal are transversally multilineated. A black streak may be seen in advance to the orbit, and another beneath it. A specimen two inches long was collected by Dr. Hayden, in Cannon Ball river, in September, 1856. We propose calling the species *B. warreni*.

Catalogue of the Birds of New Mexico as compiled from Notes and Observations made while in that Territory, during a residence of six years.

By T. CHARLTON HENRY, M. D.

Assistant Surgeon U. S. A.

The following catalogue is intended to serve the purpose of a second edition of "Notes derived from Observations made on the Birds of New Mexico, during the years 1853 and 1854," published in the Proceedings of the Academy in April, 1855.

A residence in the same territory four additional years, has enabled the writer to extend his observations very considerably, and to add much to the varieties heretofore enumerated.

It will be observed that the nomenclature has been completely modified, in accordance with the extended number of sub-families and sub-genera, which modern science has very generally adopted.

A few of the species heretofore supposed to belong to certain sub-genera, have, upon more minute inspection, proved to present variations somewhat different from those which then appeared to determine their proper classification, and have been designated accordingly.

1. CATHARTES AURA.

2. FALCO NIGRICEPS. Of this species I never was able to obtain but one individual, nor am I aware of ever observing others of like character. Met with among the mountains in the vicinity of Fort Stanton.

3. GENNAIA POLYAGRUS. Never more than three or four met with, of which two were procured.

4. FALCO SPARVERIUS. Common everywhere.

5. ACCIPITER MEXICANUS. Rarely met with.

6. ACCIPITER COOPERI. Observed about as frequently only as the above.

7. BUTEO CALURUS. A rare species, never more than eight or ten observed during six years residence in the territory. Of these I was successful in procuring four only. This is a remarkably shy and wary bird and exceedingly

difficult of approach. I have always observed them solitary and during the coldest portion of the winter along the shores of the Rio Grande. Never observed in the mountains either on the Rio Mimbres or Gila to the west, or the Sierra Blanca and Rio Ruidosa to the east and northward. This hawk appears to feed principally upon ducks as far as I have observed, which has been only during the winter season.

8. LEUCOPTERNIS HARLANI. I have met with this bird on four occasions only, once at the Big Bend of the Arkansaw river, Indian Territory, in May, 1852, and on three different occasions on the Gila river, in the summer of 1857. I was induced to believe that it breeds high up on this stream, from having observed pairs each time when seen on the Gila.

9. POECILOPTERNIS BOREALIS. Some of the specimens supposed to be of this species that were obtained are probably *P. montanus*.

10. P. LINEATUS. One specimen only obtained, the only one seen at Fort Thorn, in the winter of '56–'57.

11. P. OXYPTERUS. This hawk I met with and procured on one occasion only, on the Mimbres river, in the winter of '52–'53.

12. ARCHIBUTEO FERRUGINEUS. Met with but once, in the winter of '56–'57, on the Rio Grande, near Fort Thorn, where I procured a specimen.

13. ARCHIBUTEO LAGOPUS. Common in winter.

14. CIRCUS HUDSONIUS.

15. AQUILA CANADENSIS. Two only met with, one at the Rio Mimbres in the winter of 1853, the other at Fort Stanton on the Rio Bonita in the spring of '55, both individuals secured. The latter was found fastened to a skunk (*M. Americana*) alive, but apparently overpowered by the effluvia given out by the animal.

16. HALIÆTUS LEUCOCEPHALUS.

17. PANDION HALIÆTUS. Rather rare.

18. POLYBORUS THARUS. But one individual ever met with, in the winter of '56 at Fort Thorn on the Rio Grande, during the coldest portion of the season.

19. BUBO VIRGINIANUS.

20. OTUS WILSONANIUS. Found, but not abundantly, in all portions of the territory.

21. BRACHYOTUS CASSINII. Rarer than the preceding.

22. ATHENE HYPUGEA. 23. GEOCOCCYX CALIFORNIANUS.

24. COCCYZUS AMERICANUS. Rarely observed, and at no time among the mountains.

25. TRICHOPICUS HARRISII. A common species in every part of the territory.

26. DYCTIOPICUS SCALARIS. Quite abundant, especially along the mesquite thickets on the Rio Grande.

27. SPHYRAPICUS NUCHALIS. Replaces the *varius* in New Mexico, the latter named species being unknown there.

28. S. THYROIDEUS. Found occasionally in all the mountainous portions of the country. Rather rare.

29. MELANERPES ERYTHROCEPHALUS. During a residence of more than six years in New Mexico, but one individual of this species was observed, in the month of July, '58, upwards of a hundred miles north of Fort Thorn, on the Rio Grande.

30. M. FORMICIVORUS. Found but occasionally only among the mountains, and only in the vicinity of pine trees. This species is resident throughout the year.

31. M. TORQUATUS. This species confines its range to the mountainous parts of the country, and seems closely allied in its habits to *formicivorus*.

32. COLAPTES MEXICANUS. Replaces the *Auratus* every where south of Council Grove, Indian Territory, as my observation goes, a few miles south of the place referred to, is the farthest south I have met the *Auratus*, though it is not improbable their range may extend somewhat more southwardly.

33. SELASPHORUS PLATYCERCUS. Common, and the only species obtained. Found almost exclusively among the mountains.

34. ANTROSTOMUS NUTTALLI. Quite common everywhere.

35. CHORDEILES HENRYII. The most abundant species south of Albuquerque, New Mexico. In the portion of the territory where I was located, I do not think I met with any other night jar or true *Chordeiles*.

36. MEGACERYLE ALCYON. Not very common on the Rio Grande, but found abundantly on the Rio Gila.

37. TYRANNUS VOCIFERANS. The most common species observed.

38. T. VERTICALIS. Not uncommon.

39. SAYORNIS NIGRICANS. Not often met with, and principally on the Rio Mimbres.

40. SAYORNIS SAYUS. This species is the most familiar of its family, and delights to construct its nest under the portico of houses like our common Pewee.

41. CONTOPUS RICHARDSONII. Rarely seen.

42. PYROCEPHALUS RUBINEUS. Met with only once, on the Rio Mimbres in the summer of '53.

43. TURDUS NANUS. But two or three seen.

44. PLANESTICUS MIGRATORIUS. Rarely seen in summer, and met with most frequently during the winter in the mountains.

45. SIALIA MEXICANA. 46. S. ARCTICA.

47. REGULUS SATRAPA.

48. REGULUS CALENDULA. Both of the above two species are occasionally met with in the mountains.

49. HYDROBATA MEXICANA. Only met with on the Rio Mimbres.

50. ANTHUS LUDOVICIANUS. 51. GEOTHLYPIS TRICHAS.

52. G. MACGILLIVRAYI. One obtained on the Mimbres.

53. ICTERIA VIRIDIS. (Or var. *Longicauda*.)

54. HELMINTHOPHAGA CHRYSOPTERA.

55. DENDROICA NIGRESCENS. 56. D. CANADENSIS.

57. D. CORONATA. 58. D. STRIATA.

59. D. CŒRULA. 60. D. ÆSTIVA.

61. D. STRIATA. 62. PYRANGA ÆSTIVA.

63. P. HEPATICA. But one specimen obtained.

64. HIRUNDO HORREORUM.

65. H. LUNIFRONS. 66. H. THALASSINA.

67. H. BICOLOR. 68. COTYLE RIPARIA.

69. PROGNE PURPUREA. This latter species seems confined to the Mountains, and builds generally in hollows in pine trees.

70. AMPELIS CEDRORUM. 71. PHAINOPEPLA NITENS.

72. MYIADESTES TOWNSENDII. 73. COLLYRIO LUDOVICIANUS.

74. VIREO GILVUS. 75. MIMUS POLYGLOTTUS.

76. Oreoscoptes montanus.

77. Harporhynchus crissalis. A few observed in the vicinity of Forts Fillmore and Thorn, on the Rio Grande. Not observed in the mountains.

78. Salpinctes obsoletus. Rather abundant during winter among the mountains.

79. Telmatodytes palustris. 80. Troglodytes Americanus.

81. Certhia Americana. 82. Sitta Carolinensis.

83. S. Canadensis. 84. S. pygmea.

85. Polioptila cœrulea.

86. P. plumbea. Rarely observed, and only among the mountains.

87. Lophophanes bicolor. 88. L. Wollweberl.

89. Parus montanus. Rather common.

90. Psaltriparus minimus.

91. P. plumbeus. Both the two last named species were occasionally met with during winter in the mountains.

92. Eremophila cornuta. 93. Hesperiphona vespertina.

94. Carpodacus Californicus.

95. Carpodacus frontalis. Very much more abundant than the former, which are rarely met with.

96. Chrysomitris Mexicana. Quite common during summer among the mountains.

97. C. pinus. Very abundant during winter, both in the river valley and in the mountains.

98. Rhynchophanes Maccownii. 99. Poœcetes gramineus.

100. Coturniculus passerinus. Rarely seen.

101. Chondestes grammaca. 102. Zonotrichia Gambellii.

103. Junco dorsalis. Found only near Fort Stanton, among the mountains, where, I should judge, they rested. Never observed during winter. This species is an excellent songster.

104. Junco Oregonus.

105. Poospiza Belli. But two or three only met with.

106. Poospiza bilineata. A few met with in the summer of 1852, near Fort Fillmore, on the Rio Grande.

107. Spizella socialis.

108. Melospiza melodia. A constant resident.

109. Calamospiza bicolor. Quite common among the mountains in the summer months.

110. Goniaphela melanocephala. 111. Guiraca cœrulea.

112. Cyanospiza amœna. But one only ever obtained or seen—a male in full plumage,—at Fort Stanton, in the summer of 1855.

113. Pipilo arcticus. 114. Pipilo mesoleucus.

115. Pipilo chlorura. But one specimen obtained,—at Fort Stanton, on the Rio Bonito.

116. Molothrus pecoris. 117. Agelaius phœniceus.

118. Xanthocephalus icterocephalus. 119. Sturnella neglecta.

120. Icterus Bullockii. Never observed elsewhere than in the mountains, and only during the summer months. Not common.

121. Scolecophagus cyanocephalus. Very common along the Rio Grande during spring and autumn.

122. Corvus carnivorus. 123. Corvus Americanus.

124. Picicorvus Columbianus. Only met with in the mountains, and rarely

125. Gymnokitta cyanocephala. 126. Cyanurus Macrolophus.

127. Cyanocitta Californica.

128. Cyanocitta Woodhousei. Rarely seen.

129. Columba fasciata. 130. Zenaidura Carolinensis.

131. Meleagris Mexicana. This has, of late, been proved to be a distinct species from Gallipavo, and is the common turkey of New Mexico.

132. Tetrao obscurus. 133. Lophortyx Gambelli.

134. Callipepla squamata. 135. Cyrtonyx Massena.

136. Grus Canadensis. 137. G. Americanus.

138. Demiegretta Pealii. 139. Ardea Herodias.

140. Ardetta exilis. 141. Botaurus lentiginosus.

142. Butorides virescens. 143. Nyctiardea Gardeni.

144. Tantalus loculator. 145. Falcinellus Ordii.

146. Oxyechus vociferus.

147. Ox. montanus. Common on the high plains north of Fort Union, New Mexico.

148. Recurvirostra Americana.

149. Himantopus nigricollis. 150. Phalaropus Wilsonii.

151. Phalaropus hyperboreus. The only occasion of my meeting with this species was in May, 1855, on the Rio Bonita, at the present site of Fort Stanton. I met a large flock in full summer plumage, and secured a number of them.

152. Gallinago Wilsonii.

153. Macrorhamphus scolopaceus. Abundant during the month of September along the valley of the Rio Grande.

154. Actodromas Wilsonii.

155. A. Bonapartei. Rather rare.

156. Calidris arenaria. More abundant during the early autumn than the last.

157. Symphemia semipalmata. Several obtained near the Rio Mimbres, in May, 1857, the only occasion on which I ever met with this bird.

158. Gambetta flavipes. Common in August and September.

159. Gambetta melanoleucus. Common along the Rio Grande in the fall and winter.

160. Rhyacophilus solitarius. Not common.

161. Tringoides macularius. Not found during winter.

162. Actiturus Bartramius. A few seen during the month of August.

163. Numenius longirostris. Frequently seen during the spring and autumn.

164. Phæopus Hudsonicus. Never met with but once,—in April, 1854, on the Rio Grande.

165. Rallus Virginianus. One only met with, in the spring of 1856, near Fort Thorn.

166. Porzana Carolina. Not uncommon in September. A few seen during the winter on the Rio Mimbres.

167. Fulica Americana. 168. Cygnus Americanus.

169. Anser Gambelli.

170. ANSER FRONTALIS. May be the young of the preceding. Never but one obtained.

171. CHEN HYPERBOREUS. 172. LEUCOBLEPHARON CANADENSIS.

173. BERNICLA PARVIPES. Much more common than the preceding; breeds in the southern portion of New Mexico, in the vicinity of Fort Thorn, and above.

174. BERNICLA BRENTA. Quite rarely met with.

175. ANAS BOSCHAS.

176. ANAS OBSCURA. Much rarer than the above.

177. DUFILA ACUTA. 178. QUERQUEDULA DISCORS.

179. Q. CYANOPTERA. 180. SPATULA CLYPEATA.

181. MARECA AMERICANA. 182. AIX SPONSA.

183. FULIX MARILA.

184. F. COLLARIS. Abundant in the spring.

185. AYTHYA AMERICANA. 186. A. VALISNERIA.

187. BUCEPHALA ALBEOLA. Much more common on the mountain brooks than on the Rio Grande, but not often met with in southern New Mexico.

188. ERISMATURA RUBIDA. But few ever met with.

189. MERGUS AMERICANUS.

190. LOPHODYTES CUCULLATUS. Very common on the Mimbres, and occasionally met with on the Rio Grande.

191. CYRTOPELICANUS ERYTHRORHYNCHUS. Common above latitude 32°.

192. GRACULUS MEXICANUS. Very common during April.

193. PLOTUS ANHINGA. Not many observed.

194. LARUS DELAWARENSIS. A very few met with on the Rio Grande, in winter and spring.

195. STERNA WILSONII. Common in September on the Rio Grande.

196. S. FULIGINOSA. A few seen on the Rio Grande.

197. COLYMBUS TORQUATUS. 198. PODYLIMBUS PODICEPS.

Mr. J. P. Lesley was appointed to fill a vacancy in the Committee on Palæontology, and Mr. Joseph Jeanes to fill one in the Committee on the Library.

April 5th.

Mr. LEA, President, in the Chair.

Forty-eight numbers present.

The following papers, by Theo. Gill, were presented for publication in the Proceedings.

On Dactyloscopus and Leptoscopus, two new genera of the family of Uranoscopidæ.

On the genus Callionymus of authors.

Description of Hyporhamphus, a new genus of Fishes, allied to Hemirhamphus.

Notes on a collection of Japanese Fishes, made by Dr. J. Morrow.

And also the following:

Description of eight new species of Unionidæ, from Georgia, Mississippi and Texas, by Isaac Lea,

And were referred to committees.

Dr. Leidy stated that, in company with Messrs. Vaux, Sergeant, Powel and Tilghman, he had the day before visited the vicinity of Phœnixville, Chester Co., with the view of examining the shales recently removed in widening the rail-way tunnel. The specimens of shales or black slates, supposed to be of triassic age, presented this evening to the Academy, are those which had been collected. Besides obscure vegetable remains, species of Cypridæ and Posidoniæ, they contain scales, bones and teeth of ganoid fishes, and also teeth of three apparently distinct genera of reptiles. Two of the teeth, elongated conical in form, and finely striated, appear to belong to the genus Clepsysaurus, Lea, the remains of which were first discovered in the corresponding rocks of Lehigh Co. A third tooth, of large size, is compressed conical, and has opposite, acute, serrulated borders. It probably indicates a new genus and species, for which the name Eurydorus serridens is proposed. Fragments of similar teeth have been found in the rocks near Gwynned, Montgomery Co. A fourth tooth, much smaller than the one just indicated, has the same form, but has its borders without serrulation, and has the base fluted. It resembles the teeth of Compsosaurus, of the coal of Chatham Co., North Carolina, but, nevertheless, belongs to a different species.

The death of Mr. W. I. Broderip, of London, late a correspondent of the Academy was announced.

On leave granted, a vote of thanks, was ordered to be tendered to Dr. Alexander Bryant, for his donation of fossils, received this evening.

April 12th.

Mr. Lea, President, in the Chair.

Fifty-four members present.

Dr. Leidy stated that the specimens of ferruginous rock containing remains of fishes, presented to the Academy this evening by Dr. P. W. Mosblech, of Bethany, Virginia, were of a very interesting character. Dr. Mosblech, in a letter, states that the locality of the remains is a horizontal, ferruginous deposit, about one inch in thickness, resting upon an old vegetable soil, overlying a limestone which is considered as the uppermost member of the coal formation; and it is covered with a soft, sandy, aluminous shale, destitute of organic remains, so far as examined. The extent of the ferruginous deposit is unknown, but it seems to be confined to the College Hill, at Bethany, equal to about four acres.

The fragments of rock contain a multitude of isolated scales of ganoid fishes, and numerous teeth and small fragments of bones. Most of the teeth are of small size, and have exactly the same form and construction as those of Saurichthys, a genus of the triassic formations of Europe; but others of large size belong to the genus Diplodus, which is also found in the coal formations of other parts of the United States, and of Europe.

Dr. Leidy added that the fossils from the Green Sand, of Monmouth Co., presented this evening by Mr. J. H. Slack, consisted of fragments of jaws with teeth of Mosasaurus, several bones apparently of a reptile, of unknown character, a jaw of Enchodus, a palate bone with teeth of Pycnodus, and teeth of Otodus and Galeocerdo.

The Committee on Proceedings laid on the table the number of the Proceedings for March.

April 19th.

Mr. LEA, President, in the Chair.

Forty-nine members present.

The following were presented for publication in the Proceedings:

Ichthyological Notices by Charles Girard, M. D.

On the primary divisions of the Salamandridæ, with a description of two new species, by E. D. Cope.

Description of twenty-one new species of Exotic Unionidæ, by Isaac Lea.

Description of two new species of Uniones, from Georgia, by Isaac Lea.

Dr. Leidy remarked, that Mr. Jos. B. Hanson, an intelligent merchant of this city, had recently addressed to him a note, to call at his warehouse and examine some masses of the so-called Sombrero guano, containing fossil bones. Two large masses of this substance, now on the table and presented to the Academy by Mr. Hanson, include a number of turtle bones, among which the posterior portion of a sternum of an individual is well preserved. The included bone fragments significantly point to the origin of the rock, imported as a manure rich in phosphates, from the island Sombrero, W. I. This island, situated about 130 miles east of Porto Rico, Mr. Hanson informs us, is about 2½ miles long, ½ to ¾ of a mile wide, and rises from 20 to 40 feet above the level of the ocean. It is a barren rock formerly avoided by navigators, and appears to be entirely composed of the rich phosphatic mineral. Analyses of the substance, by competent chemists, indicate it to bear a resemblance in composition to bones deprived of their cartilage, and otherwise altered, as we might suppose bones to be, exposed to the influence of the ocean water. It contains about the same proportion of phosphate of lime as calcined bones; and it is this circumstance which has directed the attention of enterprising merchants and agriculturalists to its value as a manure.

When we recollect that the cereal grains, buckwheat, clover and other leguminous seeds yield in their ash from 30 to 50 per cent. of phosphoric acid, we cannot but feel the conviction that the Sombrero substance, with its 75 per cent. of phosphates, must prove to be of far more permanent value than the true guano. From this, the Sombrero material deserves to be distinguished by a new name, and perhaps the easy one of Osite, from its resemblance in composition to bones and its probable origin, would not be inappropriate. But are we to ascribe the immense mass forming the Sombrero rock to animal origin? Many reefs and shores of vast extent are known positively to have had their origin in the testaceous coverings of the lower animals, but Sombrero appears to be the first instance of an extensive island formed alone of the remains of the higher animals. The composition of the Sombrero substance, with its included bones, leads us to suspect that the island was once a shoal swarming with turtles and other vertebral animals, whose accumulated remains of ages have been cemented together, and gradually elevated above the ocean level to the present position of the island.

Mr. Hanson informs us that no animals inhabit the latter, independently of birds, except a lizard, about one foot in length, specimens of which he has promised to obtain for the Academy.

Dr. Leidy further remarked that the bear skull presented this evening by Mr. W. D. Moore, of Oxford, Mississippi, had been found, in association with two portions of jaws with teeth of the Mastodon, in the drift of Claiborne Co., Mississippi. The skull does not differ from that of the common black bear, Ursus Americanus. It is the fourth instance in which Dr. L. has noticed the occurrence of remains apparently of this species in association with those of Mastodon, Megalonyx, and other extinct animals.

On leave granted, a vote of thanks was ordered to be tendered to Mr. I. W. Gregory, for the body of the Bengal tiger, presented this evening.

April 26th.

Vice-President BRIDGES in the Chair.

Forty members present.

The report of the Biological Department for the present month was read.

On report of the respective Committees, the following papers were ordered to be printed in the Proceedings:

Descriptions of Eight New Species of UNIONIDÆ, from Georgia, Mississippi, and Texas.

BY ISAAC LEA.

UNIO SPISSUS.—Testâ lævi, ellipticâ, subventricosâ, posticè obtusè angulatâ subæquilaterali; valvulis crassis; natibus prominulis; epidermide striatâ, rufo-fuscâ, obsoletè radiatâ; dentibus cardinalibus magnis, erectis, compressis, crenulatis, in utroque valvulo subduplicibus; lateralibus longis, crassis subcurvisque; margaritâ vel purpureâ vel salmonis colore tinctâ et iridescente.

Hab.—Satilla River, Wayne County, Georgia. T. C. Downie.

UNIO CORVUS.—Testâ lævi, subtriangulari, subcompressâ, inæquilaterali, posticè obtusè biangulatâ; valvulis crassis, anticè crassioribus; natibus subprominentibus; epidermide nigricante, supernè glabrâ, politâ, infernè striatâ; dentibus cardinalibus subgrandibus, subconicis striatisque; lateralibus longis curvisque; margaritâ albâ et iridescente.

Hab.—Buckhead Creek, Burke County, Georgia. Bishop Elliott; and Ogeechee River, Georgia. Prof. Hanley.

UNIO BURKENSIS.—Testâ lævi, transversâ, compressâ, ad latere planulatâ, inæquilaterali, posticè biangulatâ; valvulis crassiusculis; natibus prominulis; epidermide fusco-flavicante, micante et obsoletè radiatâ; dentibus cardinalibus breviusculis, compressis, acuminatis; lateralibus longis rectisque; margaritâ purpurascente et iridescente.

Hab.—Buckhead Creek, Burke County, Georgia. Bishop Elliott.

UNIO AUREUS.—Testâ lævi, subtriangulari, compressâ, ad latere paulisper planulatâ, subinæquilaterali; valvulis subcrassis, anticè crassioribus; natibus subelevatis, ad apices acuminatis; epidermide aureâ, striatâ, obsoletè radiatâ; dentibus cardinalibus crassis, erectis, striatis, in utroque valvulo duplicibus; lateralibus curtis et obliquis; margaritâ albâ et iridescente.

Hab.—Texas. W. Newcomb, M. D.

UNIO CURTUS.—Testâ lævi, obliquâ, ad umbones valdè tumidâ, anticè truncatâ, posticè obtusè angulata, valdè inæquilaterali; valvulis percrassis, anticè crassioribus; natibus elevatis, crassis, ferè terminalibus; epidermide tenebroso-castaneâ, ad apices virescente, obsoletè radiatâ; dentibus cardinalibus subgrandibus, compressis, acuminatis, obliquis; lateralibus crassis subcurvisque; margaritâ argenteâ et iridescente.

Hab.—Tombigbee River, Columbus, Mississippi. Wm. Spillman, M. D.

UNIO PERMISCENS.—Testâ lævi, obovatâ, inflatâ, posticè latè rotundatâ, valdè inæquilaterali; valvulis tenuibus; natibus prominulis; epidermide tenebroso-fuscâ, nigricante, obsoletè perradiatâ, nitidâ; dentibus cardinalibus parvulis,

compressis, obliquis; lateralibus prælongis, lamellatis subcurvisque; margaritâ cæruleo-albâ et valdè iridescente.

Hab.—Tombigbee River, Columbus, Mississippi. Wm. Spillman, M. D.

MARGARITANA ELLIPTICA.—Testâ lævi, ellipticâ, subinflatâ, subæquilaterali, posticè obtusè angulatâ; valvulis tenuibus; natibus subprominentibus, ad apices subconcentricè undulatis; epidermide luteo-virente, glabrâ, nitidâ, perradiatâ; dentibus cardinalibus parvis, compressis, in utroque valvulo singulis; margaritâ cæruleo-albâ et iridescente.

Hab.—Tombigbee River, Columbus, Mississippi. Wm. Spillman, M. D.

ANODONTA TEXASENSIS.—Testâ lævi, ellipticâ, inflatâ, ad latere rotundâ, inæquilaterali, posticè subangulatâ; valvulis pertenuibus; natibus subprominentibus, ad apices biundulatâ; epidermide dilutè luteâ, glabrâ, fulgidâ, obsoletè radiatâ; margaritâ cæruleo-albâ, diaphanâ et valdè iridescente.

Hab.—Texas. W. Newcomb, M. D.

ICHTHYOLOGICAL NOTICES.

BY CHARLES GIRARD, M. D.

XLI. Since we are again called upon to mention the genus *Zygonectes*, we will venture to point out such structural peculiarities, as, in our opinion, may be considered its generical characters. Body rather slender and elongated, compressed, subfusiform in its profile, and covered with well developed scales. Head rather small, depressed, subpyramidal. Mouth very protractile, its gape being horizontal, whether in a protracted or a retracted condition. Teeth upon the premaxillar bones and upon the lower jaw; an external series slender and acerated, behind which may be observed a band of velvet-like ones. The origin of the anal fin is opposite the anterior margin of the dorsal, or in advance of it. The genus *Zygonectes* appears to be intermediate between *Hydrargyra* and *Gambusia*, resembling more the former by its general aspect, and the latter by its structure.

Specimens of a species of this genus, and which we call *Z. pulchellus*, were collected in Sugar Loaf Creek, Arkansas, by the party under Capt. A. W. Whipple. The largest one measures two inches and a half in total length, of which the head constitutes rather more than the fifth. The eye is large and circular; its diameter entering four times in the length of the side of the head. The dorsal and anal fins are deeper than long; the anal being larger than the dorsal, and placed more anteriorly, so that its anterior margin is nearly equidistant between the apex of the snout and the posterior margin of the caudal fin. The tip of the posterior rays of the dorsal extend as far as the insertion of the caudal, that is, a little further backwards than the tip of the posterior rays of the anal fin. The ventrals and the pectorals are but moderately developed; the tip of the former extends to the vent, whilst the latter do not quite reach the insertion of the ventrals. The rays of the various fins are as follows:—D 9; A 12; C 3, 1, 7, 6, 1, 3; V 6; P 13.—There are twelve longitudinal rows of scales between the anterior margin of the dorsal and that of the anal fin. The surface of the scales has a rather rugose appearance, owing to the conspicuousness of the concentric lines of growth. The scales themselves are deeper than long, anteriorly subtruncated or subconvex; undulating and rounded off upon the remaining edges.

The ground color is olivaceous brown, of a darker tint along the dorsal region than over the abdomen. A black band or streak extends from the nose, across the eye, along the middle of the flank to the base of the caudal fin. Small black dots, constituting four or five irregular longitudinal series, may be observed on either side of the dorsal region, above the lateral streak; the dorsal, anal, and caudal fins being likewise dotted with black, whilst the ventrals and pectorals are unicolor, like the abdomen.

XLII. Having had, recently, an opportunity of examining authentic specimens of either species of *Limia*, inhabiting the island of Cuba, and described by Prof. Poey, we are now better prepared to speak of those species which occur along our own shores and in the Mexican provinces bordering the Rio Grande Boundary.

And before we proceed any further into the history of these fishes, we deem it expedient to recapitulate the characters of that genus.

The body, generally speaking, is rather short and deep, very much compressed, and covered with comparatively large scales. The upper surface of the head is depressed, sloping forwards, wedge-shaped in general appearance. The mouth is small, or else, of moderate size, very protractile, directed upwards when in a retracted condition, the lower jaw then appearing longer than the upper; but when protracted, the aperture is directed horizontally forwards, and somewhat downwards, assuming the shape of a flattened (depressed) tube, the jaws being equal. Either jaw exhibits a row of slender, curved and acerated teeth, behind which a narrow patch of minute, velvet-like ones may be observed. The anal fin is inserted posteriorly to the anterior margin of the dorsal, and differently constructed according to the sexes. The dorsal fin itself is higher and longer in the male than in the female. The posterior edge of the caudal is subtruncated or rounded off.

In the above diagnosis of the generical characters to be assigned to *Limia*, it is easy to perceive a most intimate affinity between that genus and *Pœcilia*. Indeed, the only difference which is noticeable, resides in the structure of the anal fin of the male sex, which is narrower and deeper than in the female, and inserted more anteriorly, close to the ventrals; the anterior rays being much more developed than the posterior ones, which are partly atrophied. Now, such a distinction may not appear of sufficient importance, and ichthyologists might raise the question of preserving these two genera in the nomenclature. In the present state of our personal knowledge regarding these fishes, we should not have established a generic distinction upon that character alone. But, since these genera exist, we shall, for the present at least, speak of them under separate heads, leaving it with future investigations to decide upon their intrinsic value. Our reason for so doing is the lack of specimens of most of the species referred to the genus *Pœcilia*, in the "Histoire naturelle des Poissons," and described from specimens of the female sex alone. Moreover, we may expect many new species from Mexico and Central America, which may throw considerable light upon the natural history, yet so imperfectly known, of these little fishes.

We have examined specimens of *Pœcilia multilineata*, collected at Palatka, East Florida, by T. Glover. Lesueur himself admits their identity with those he obtained from Lake Ponchartrain. Not having at our command specimens of the latter locality, we are not prepared to express any opinion regarding that point. But we have had under examination from that locality, *Mollinesia latipinna*, which is considered now as the male sex of *Pœcilia multilineata*. These exhibit the same generical characters which we have assigned to *Limia*; therefore, should further investigations corroborate a generic distinction between *Pœcilia* and *Limia*, the latter appellation will have to give way to *Mollinesia*, as having priority over it.

Male and female specimens of this same species were collected at Galveston, Texas, by Dr. C. B. R. Kennerly, under Capt. A. W. Whipple.

XLIII. The species which we have described under the name of *P. lineolata*, in the "Ichthyology of the U. S. and Mex. Boundary Survey," from specimens collected at Brownsville, near the mouth of the Rio Grande del Norte (Rio Bravo), belongs to the same genus as the former species. It is closely allied to *P. multilineata*, the female sex being compared, the male sex having not yet come under observations. It differs from the latter by a smaller head, a smaller

eye, and a smaller mouth; the dorsal fin is also placed more anteriorly. The system of coloration being exactly the same in either species.

XLIV. The species which we have called *Limia pœciloides* is but very imperfectly characterised in the "Ichthyology of the U. S. and Mex. Boundary." Moreover, figs. 12—14, of plate xxxviii, do not belong to the same species. Hence the male sex only is so far known; it is represented on the plate just alluded to, figs. 8—11.

Now then, if we recapitulate the characters to be assigned to this species, we shall have the following diagnosis:—The back is arched and the abdomen quite convex; the greatest depth taken in advance of the anterior edge of the dorsal fin enters somewhat less than four times in the total length. The head is contained four times and a half in the total length; external series of teeth very slender and exiguous. Diameter of eye entering three times and a half in the length of the side of the head. Dorsal fin nearly as long as deep, superiorly convex, its anterior margin being nearer the apex of the snout than the insertion of the caudal. The caudal itself is posteriorly rounded off or convex. The anal fin is inserted opposite the middle portion of the base of the dorsal. Ventrals small and slender, inserted immediately in advance of the anterior edge of the dorsal; their posterior extremity stretching beyond the anterior edge of the anal fin and overlap, consequently, the vent. The pectorals being rather short and broad, subelliptical in their outline. The rays are: D 13; A 6; C 2, 1, 7, 7, 1, 2; V 6; P 13.—The ground color is reddish-brown, with transverse narrow bands of a darker tint and a small blackish spot at the base of each scale, constituting about seven longitudinal series on either side of the body. The caudal fin is likewise transversely spotted, whilst the other fins are unicolor.

Specimens of this species were collected at Indianola, Texas, by John H. Clark, under Col. J. D. Graham.

XLV. A very pretty little species of *Limia*, which we call *L. formosa*, was likewise caught by John H. Clark, under Major Emory, in a lagoon at Paolo Alto. Of this, we have a specimen of either sex, the female differing widely from the male. We will proceed describing them, one after the other.

The male resembles somewhat the same sex in *L. pœciloides*, from which it may, however, be distinguished at first glance, by a greater depth at the peduncle of the tail. The back is likewise less arched, and the abdomen less convex; the greatest depth of the body, at the origin of the dorsal, entering somewhat over four times in the total length. The head constitutes about the fourth of the total length; the eye, which is large and circular, enters three times in the length of the side of the head by its diameter. The snout is rather abbreviated. The dorsal fin is longer than high, and convex or subconvex upon its upper margin. The caudal is rounded off posteriorly. The anal fin is inserted nearly opposite the anterior margin of the dorsal; it is slender and deep, but far from extending as far back as the posterior rays of the dorsal. The ventrals, which are slender, are inserted in advance of the anterior margin of the dorsal, at a short distance from the anal, between which there is just space enough for the anal aperture. Their extremities project beyond the base of the anal fin, particularly the second ray, which is longer than the rest. As to the pectorals, they are rather broad and proportionally well developed.

The female specimen, which measures one inch and a half, is more slender than the male. We take it, however, that when adult and full of roe, the proportions of the body may assume a different aspect. The greatest depth is equal to the length of the head, which constitutes the fourth of the total length. We notice the same abbreviated snout and large eyes, as in the male sex. The dorsal fin is nearly as high as long, and almost of equal depth throughout, its upper margin being straight or subconvex; the anterior margin of that fin is somewhat nearer the insertion of the caudal than the apex of the snout. The

anal fin, which is deeper than long, is inserted opposite the posterior portion of the base of the dorsal. The ventrals are small, subtriangular when expanded, their posterior extremity not extending as far as the anterior edge of the anal. The pectorals are well developed, elongated, posteriorly rounded off, their extremities projecting beyond a line drawn at the origin of the ventrals. The rays of the fins are:—D 12; A 10; C 7, 1, 8, 7, 1, 6; V 6; P 9.—We have counted thirteen rays in the dorsal fin of the male sex, and seven in the anal. The structure of the latter is as follows:—First and second ray simple, short, and slender; third and fourth most developed, third one stoutest; fifth, sixth, and seventh slender, but deeper than the first and second, and bifurcated. The scales are very similar in either sex, much deeper than long, anteriorly truncated, with numerous radiating furrows upon the latter section only, and rounded off upon the remaining edges, with very fine concentric lines of growth. The ground color is olivaceous brown; the dorsal region assuming a darker tint, owing to a brown spot which may be observed on the scales, whilst the abdominal region has a lighter and more yellowish aspect. The dorsal fin alone exhibiting transverse series of blackish spots: the other fins being unicolor.

XLVI. Lieut. D. N. Couch has collected, in the waters of the Rio San Juan, at Cadarecta and Monterey, in the Province of New Leon, a species of *Limia*, which differs widely from its congeners, as will be shown presently. Unfortunately, all the specimens are of the female sex. The largest of these measure one and five-eighths of an inch, being apparently full grown, or, at any rate, adult, for the abdomen is distended by the presence of numerous embryos. The body appears to be rather short and contracted; the back being convex and gently sloping forwards. The head is small, constituting about the fifth of the total length. The orbit occupies the third of the side of the head. The dorsal fin is longer than high, superiorly subconvex, its anterior margin being nearer the insertion of the caudal than the apex of the snout. Its entire base is placed upon the posterior declivity of the back. The posterior margin of the caudal is, as usual, convex. The anal fin is inserted opposite the posterior portion of the base of the dorsal; it is narrow and rather deep, and its extremity extends further back than the posterior rays of the dorsal. The ventrals are comparatively of moderate size, sublanceolate, their extremity extending to the vent. As to the pectorals, they are narrow and elongated, rounded off posteriorly, not reaching a vertical line drawn at the insertion of the ventrals. The rays are:—D 9; A 6; C 4, 1, 9, 8, 1, 3; V 6; P 11.—The scales are very large, and exhibit the general structure alluded to in the other species. The dorsal region to the middle of the flanks is almost entirely chestnut-brown, so large are the spots which are observed on every scale. An obsolete band of black exists along the sides. The abdomen and inferior region of the tail are yellowish, with a golden reflect. The fins are unicolor, except the dorsal, which exhibits a few blackish spots. We call this species *Limia couchiana*.

XLVII. Another species of *Limia* appears to be common about Matamoras, where it was first collected by the late L. Berlandier, whose collection has since been purchased by Lieut. D. N. Couch, a lover and cultivator of natural sciences.

Specimens of the male sex measure nearly two inches in total length, of which the head, which is rather small, constitutes about the fifth part. The body is very much compressed, rather deep, maintaining its depth along the peduncle of the tail. The upper surface of the head, as usual, is very much depressed and flattened. The profile is gently sloping from the origin of the dorsal fin to the apex of the snout. The eye is well developed, subcircular, its diameter entering about three times in the length of the side of the head. The dorsal fin is longer than high, and equally elevated throughout its whole length, the tip of its posterior rays not extending as far as the insertion of the caudal fin. The anal is inserted somewhat posteriorly to the anterior margin of the

dorsal, and close to the ventrals, from which it is separated by the anal aperture alone. The ventrals themselves are of moderate development, overlapping the vent and projecting beyond the insertion of the anal; the second ray is much longer than the rest. The pectorals are elongated, their tips extending beyond the insertion of the ventrals and the origin of the anal without reaching as far as the tip of the ventrals. The rays are:—D 14; A 7; C 5, 1, 9, 8, 1, 5; V 6; P 12.

The largest specimens of the female sex which have come under our observation, measure but an inch and a half. The general aspect of the body is the same as in the male sex; the head, however, is somewhat larger, being contained about four times and a half in the total length. The dorsal fin is much smaller than in the male, and convex upon its upper margin. The anal fin is rather small and inserted opposite the middle region of the dorsal. The ventrals overlap the vent, but their extremities do not quite reach the anterior margin of the anal. The tip of the pectorals extends beyond the origin of the ventrals, but not as far as the anal fin. The anal fin has nine rays. The second ray of the ventrals is even with the rest. The scales are large, much deeper than long, anteriorly subtruncated, and rounded off upon the rest of the periphery. Radiating furrows may be observed upon their anterior section only.

The ground color is reddish brown, lighter beneath than above, with longitudinal series of dark spots corresponding to the series of scales, and more conspicuous along the dorsal region than elsewhere. The dorsal fin is transversally barred with series of blackish spots, as well as the upper lobe of the caudal. The other fins being unicolor.

The above species we propose to designate under the name of *Limia matamorensis*.

XLVIII. A new genus to which we give the name of *Adinia*, has the general physiognomy of *Limia*, but differs from it, as well as from *Pœcilia*, by the structure of its mouth. The latter is protractile, rather cleft, nearly horizontal when retracted, and slightly directed downwards when protracted; the jaws being equal, the snout subconical, instead of being truncated as in *Limia* and *Pœcilia*. The lower jaw is also better developed than in the genera just alluded to, and the upper one is convex instead of being depressed. The male sex differs but little from the female; the dorsal and anal fins holding the same relative position in either of them,—being simply larger in the male than in the female. The posterior margin of the caudal fin is subtruncated.

Specimens of the typical species of this genus, and, as yet, the only one known, were collected at Galveston, Texas, by Dr. C. B. Kennerly, under Capt. A. W. Whipple, at St. Joseph's Island, Tex., by Gustavus Wurdemann, and at Indianola, Tex., by John H. Clark, under Col. J. D. Graham. The largest ones observed measure less than an inch and a half in total length, in which the head enters about three times and a half. The head is, therefore, well developed, wedge-shaped, the profile being quite declivous from the origin of the dorsal fin to the apex of the snout. The greatest depth of the body corresponds to the anterior margin of the dorsal, and diminishes rapidly backwards. The eye is large and circular, its diameter entering three times and a half in the length of the side of the head: once in advance of its anterior rim. The dorsal fin is higher than long, and quite elevated in the male sex; its anterior margin is nearly equidistant between the apex of the snout and the posterior edge of the caudal fin. The anal fin is deeper than long, and deeper in the male than in the female; its anterior margin corresponding to the middle of the base of the dorsal, and extends more backwards than the latter fin. Its exterior margin is rounded off, or convex. The ventrals are rather broad and overlap the vent, whilst the pectorals are elongated and extend beyond the origin of the ventrals. The second ray of the latter fins does not project beyond the others, as is the case with the species of *Limia*. The rays are:—D 9; A 11; C 4, 1,

8, 7, 1, 4; V 6; P 15.—The scales are somewhat deeper than long, anteriorly truncated and posteriorly rounded, whilst the upper and lower margins are nearly straight and parallel. The concentric lines of growth are very fine and numerous, and short radiating furrows occupy almost the entire anterior margin.

The dorsal region and upper surface of the head are greyish olive or olivaceous brown, with a darker line at the periphery of the scales. The flanks are fasciated alternatively with greyish brown and light yellowish transverse narrow bands, the more conspicuous as they approach the peduncle of the tail; the brown bands being wider than the light yellowish ones; there are however instances in which light streaks subdivide the brown bands. The opercular apparatus is silvery: the lower part of the head and the belly exhibiting a uniform light olivaceous or yellowish tint.

The name of *Adinia multifasciata* appears to us quite characteristic of the species which is here described. An immature female specimen is figured on Plate xxxviii, figs. 12–14 of the "Ichthyology of the U. S. and Mexican Boundary," where it is given as the female sex of *Limia pœciloides*, an error which we now rectify.

XLIX. Another new genus, which we call *Lucania*, has the general appearance of *Fundulus*, from which it differs by the presence, upon the jaws, of one row of teeth only; the mouth itself being fashioned as in *Fundulus:* the upper jaw being smaller and somewhat shorter than the upper, arched sideways and subdepressed superiorly. The head is somewhat rounded off and blunt. The insertion of the anal fin is more posteriorly than the dorsal. The caudal is rounded off. The scales are of but moderate development, deeper than long, with fine concentric striæ, and furrowed upon their anterior section. The sexes afford no greater differences than in *Fundulus* and *Hydrargyra*.

The typical species of the genus which is here instituted, was figured and described by us under the name of *Limia venusta* in the "Ichthyology of the U. S. and Mexican Boundary," plate xxxix, figs. 20—23, p. 71. Its present systematic name, therefore, will be *Lucania venusta*. Fig. 21 gives a most perfect idea of the shape and structure of the mouth. The lateral line is not always so conspicuous as represented in fig. 20. The teeth themselves are proportionally larger than in the following species. The anterior margin of the dorsal fin is nearly equidistant between the apex of the snout and the insertion of the caudal. The anal is placed opposite the posterior half of the dorsal, and consequently projects further back. The ventrals are slender, extending as far as the vent, and composed of six rays and not five, as formerly stated. The pectorals are elongated, posteriorly rounded off, and projecting beyond the insertion of the ventrals. The rays are:—D 13; A 11; C 3, 1, 8, 8, 1, 2; V 6; P 10.—The scales are deeper than long, anteriorly subtruncated, rounded off upon the remaining edges, with radiating furrows upon the anterior section only, the concentric lines of growth being very fine. The ground color is reddish brown, with groups of dark dots on the centre of the scales; the fins being unicolor, of a yellowish olive tint. A specimen of this species was collected at Indianola, Tex., by John H. Clark, under Col. J. D. Graham, while on the U. S. and Mexican Boundary Survey.

L. We find in the collection of the late L. Berlandier two specimens of a species of *Lucania*, collected in the neighborhood of Matamoras, resembling very closely the preceding one. The only differences which we are able to detect consist in a larger mouth and larger scales, a more backward position of the dorsal and anal, together with the following formula of the fins:—D 12; A 11; C 4, 1, 7, 7, 1, 3; V 6; P 12.—The coloration is the same. The specimens not being perfect, a further comparison could not be instituted. We shall designate them provisionally under the name of *Lucania affinis*.

LI. Amongst the fishes collected in the vicinity of the city of Mexico, by Maj.

W. Rich, in 1853, we notice a cyprinodont of a very peculiar external appearance, belonging nevertheless to the genus *Lucania*, as characterized above.

One of the female specimens measures two inches and a half in total length. The dorsal region is very much arched from the insertion of the dorsal fin to the nape, which is quite swollen. The head is rather small, constituting the fifth of the total length, its upper surface is subdepressed, the occipital region appearing concave from the sudden rising of the nape, a trait less conspicuous in smaller specimens of the same sex and in the males also. The snout is short, thick and blunt. The gape of the mouth is oblique upwards as in the other species of this genus. The eye is subcircular, its diameter entering three times and a half in the length of the side of the head. There are three slender branchiostegal rays on either side, the outermost being exiguous. The anterior margin of the dorsal fin is nearly equidistant between the apex of the snout and the posterior margin of the caudal fin; its upper margin is convex and its base is longer than the height of the middle rays. The caudal fin enters a little short of seven times in the total length. The anal is smaller than the dorsal, but has the same shape, and the same proportions between its base and its depth. Its anterior margin is placed posteriorly to that of the dorsal; the tip of its rays extending but very slightly further back than those of the latter,—so that the two fins are nearly even posteriorly. The ventrals are very small and reach the vent with their extremities. The pectorals are of moderate development, rounded off, not extending as far as the origin of the ventrals. The rays are:—D 20; A 23; C 5, 1, 10, 10, 1, 6; V 6; P 12.—The scales are comparatively small, deeper than long, subelliptical in their outline, exhibiting extremely fine concentric lines of growth, and provided with radiating furrows upon their anterior section alone. The ground color is olivaceous brown, with transverse dark brown bands which run occasionally together giving the entire body, head and fins, a greyish black appearance. Otherwise the fins assume a greyish olive tint.

The male sex is more slender than the female; the dorsal and anal fins being somewhat more developed, and the back less arched. The coloration is similar in either sex.

LII. In speaking of the generical characters to be assigned to *Girardinus*, and especially of the structure of the mouth, we ought to have stated that the latter is depressed, instead of being rounded, and constructed after the fashion of that of *Pœcilia* and *Limia*, so that its gape is directed upwards when contracted, and downwards when protracted. Accordingly its affinities with the latter two genera are more intimate than with *Gambusia*.

The specimen of *Girardinus occidentalis*, figured, size of life, on plate xxxix, of the "Ichthyology of the U. S. and Mex. Boundary," is the largest of those collected in the Rio Santa Crux, by John H. Clark, under Col. J. D. Graham. Specimens two inches and a quarter in total length were subsequently collected at Tuczon, Sonora, by Arthur Schott, under Major Emory. All these specimens belong to the female sex. The following formula of the fins is to supersede that which has been previously published:—D 7; A 7; C 4, 1, 7, 7, 1, 3; V 6; P 12.—The scales are subelliptical, deeper than long, with radiating furrows upon the anterior section alone. The ground color is either reddish or olivaceous brown above, and yellowish white beneath, with a golden reflect during the breeding season. The periphery of the scales exhibits blackish dots occasionally so crowded as to assume a dark appearance. Along the middle of the flanks may be seen a black fillet which imitates a lateral line; the series of scales over which it runs is sometimes entirely black. A black streak is observed along the under edge of the peduncle of the tail. The fins are of a uniform light yellowish tint.

We refer, for the present, to the same species, numerous specimens in a rather indifferent state of preservation, collected at Tuczon, by Dr. A. L. Heermann, under Lt. J. G. Parke. Amongst them we observe several individuals

of the male sex, measuring about an inch and a quarter in total length, rather slender in general appearance, and resembling somewhat the same sex in *Gambusia*. The anal fin, however, is more slender and deeper than in the latter genus, it being composed of but two developed rays preceded and followed by inconspicuous rudimentary ones. The other fins are so much mutilated as not to allow counting their rays with any degree of certainty. The coloration is the same as in the female sex, just alluded to above.

LIII. Specimens of a species closely, allied to the foregoing one, were collected in San Bernardino creek, Mex., by Dr. C. B. R. Kennerly, under Major Emory. That creek, it will be remembered, flows westwards of the Sierra Madre, mingling its waters with those of the Rio Yaqui, which empties itself into the Gulf of California.

The largest of these specimens belonging to the female sex measure two inches and a quarter in total length, being therefore of the same size as some of those of the preceding species. Nothing is more alike than the general aspect of these two species; the present one, however, is more stoutly built. The head constitutes about the fifth of the total length. The caudal fin is posteriorly subtruncated. The dorsal and anal fin are inserted somewhat farther back, each being provided with eight rays instead of seven; otherwise the formula is the same:—D 8; A 8; C 4, 1, 7, 7, 1, 3; V 6; P 12.—The scales have the same shape and structure, but they are proportionally smaller, than in the preceding species.

The specimens of the male sex, measure about an inch and a quarter or a little more. They bear the same relations to their females as those of the preceding species. The dorsal fin exhibits likewise eight rays.

The ground color, in either sex, is of a dark chestnut brown, with black dots at the periphery of the scales, and a lateral black fillet covered by a lateral streak of the width of a scale. A narrow dark streak may also be observed under the peduncle of the tail. In its coloration, therefore, this species does not differ very materially from the foregoing one. The lateral streak alone appears as a more constant feature.

We shall designate it provisionally under the name of *G. sonoriensis*.

LIV. Let it be recalled to mind here, that the mouth in *Gambusia* is constructed after the fashion of *Hydrargyra* and *Zygonectes*, and that its gape is horizontal when protracted, and oblique upwards when in a contracted state. Indeed, the affinities between *Gambusia* and *Zygonectes* are of the most intimate kind, since in *Zygonectes* the anterior margin of the anal fin is sometimes situated in advance of the anterior margin of the dorsal. It is true, we find a slight difference between these two genera, in the gape of the mouth when in a protracted condition, and also in the sexes, which assume a different aspect in *Gambusia*, whilst in *Zygonectes* the differences between the male and the female are a great deal more restricted.

The party under Lt. J. G. Parke, on its way home, collected in Camanche Spring specimens of both sexes of *Gambusia nobilis*, the male of which we had not observed so far. It has the same general aspect as its female, figured on plate xxxix, of the "Ichthyology of the U. S. and Mex. Boundary," being rather short and deep bodied compared to its congeners. In coloration both sexes agree. The largest specimens of the female sex measure two inches and those of the male one inch in total length.

LV. Specimens of *Gambusia affinis* were also collected in San Pedro creek, Tex., and in Dry creek near Victoria, Tex., by Dr. C. B. R. Kennerly, under Major Emory. The male sex measures one and a tenth of an inch in total length, and compares well with the female figured on plate xxxix, of the "Ichthyology of the U. S. and Mex. Boundary," having the same slender appearance and general aspect. The anal fin is somewhat deeper than in *G. patruelis* represented on the plate just alluded to. The color is similar in either sex.

LVI. As to *Gambusia patruelis*, numerous specimens of that species were collected in the upper affluents of the Rio Nueces, by Dr. C. B. R. Kennerly, under Capt. A. W. Whipple, during the Exploration near the thirty-fifth parallel, for a railroad route to the Pacific. The average size of either sex corresponds pretty nearly to the specimens figured on plate xxxix, of the "Ichthyology of the U. S. and Mex. Boundary." Specimens from the Rio Leona, Rio Blanco, and Rio Seco, exhibit a somewhat lighter tint than those from the lower part of the same hydrographic basin. But this may be an alteration subsequent to their immersion in alcohol.

LVII. A curious little species of *Gambusia* from the hydrographic basin of the Rio San Juan, specimens of which having been collected in Rio San Diego, one of its affluents, near Cadereita, New Leon, by D. N. Couch. The largest ones measure an inch and a half in total length, and belong to the female sex alone. The body is deep upon its middle and the tail tapering. The head enters about four times and a half in the total length. The eye is proportionally large and circular; its diameter entering three times in the length of the side of the head. The dorsal fin is very narrow and elevated, and proportionally higher than in the other species so far known of this genus. The anal fin is likewise narrow and deep, and resembles the dorsal in that respect. The ventrals are small, and the pectorals well developed. We have not been able to count with accuracy the rays of the fins, owing to the desiccated condition of the specimens preserved; in the dorsal and anal fins they are less numerous than in the other species of the genus. The color of the body is reddish-brown, except the belly, which is yellowish or whitish. Small black spots may be observed along the dorsal region near the base of the scales. The dorsal and anal fins are greyish; the caudal ventrals and pectorals, olivaceous.

The species might be designated under the appellation of *Gambusia speciosa*.

LVIII. In the collection of the late Louis Berlandier, of Matamoras, we find another species of *Gambusia*, which differs from its congeners by the slenderness of its form and general appearance: hence the name of *G. gracilis* by which we propose to record it.

The largest female specimens measure about an inch and a half in total length, of which the head constitutes a little more than the fifth. The mouth is rather large compared to that of the foregoing species. The diameter of the eye enters about three times in the length of the side of the head. The body in its profile is subfusiform. The dorsal fin is higher than long, superiorly convex. The caudal is rounded off posteriorly. The anal is larger than the dorsal, deeper than long and exteriorly convex, the posterior extremity of its insertion being nearly opposite the anterior margin of the dorsal. The tip of the ventrals extends almost to the anterior margin of the anal. The pectorals are well developed and project beyond the insertion of the ventrals. The rays are:—D 6; A 9; C 5, 1, 6, 6, 1, 4; V 6; P 13.—The scales are moderate sized, much deeper than long, subelliptical in their outline, more convex posteriorly than anteriorly with numerous and well developed radiating furrows upon the anterior portion alone.

The largest male specimens which have come under our observation measure a little over an inch in total length. They are very similar to the female sex, rather more slender. The anal fin exhibits the usual structure peculiar to that genus. The first ray is a mere rudiment; the second being the stoutest and longest; the third forms, with the second, the elongation of that fin, and is followed by four shorter rays somewhat better developed, however, than in the other species, which we have examined.

The color is olivaceous brown; the dorsal and caudal fin exhibits narrow transverse, blackish bars; the other fins being olivaceous.

LIX. Mr. John Potts has collected in Chihuahua River another species of *Gambusia* which appears to reach a larger size than any of the foregoing spe-

cies, reminding us somewhat by its general appearance those occurring in Cuba.

The specimens before us are all of the female sex, and measure two inches and a quarter in total length, in which the head enters about five times. The head itself is rather short, whilst the mouth is proportionally large. The diameter of the eye enters thrice in the length of the side of the head. The dorsal fin is higher than long, somewhat convex superiorly. The caudal is rather short and subtruncated posteriorly. The anal is deeper than long and a little broader than the dorsal; the middle of its insertion corresponding to the anterior margin of the dorsal. The ventrals are very small and far from reaching the vent with their extremities. The pectorals are of moderate development, spear-shaped when not expanded. The rays are:—D 9; A 10; C 6, 1, 7, 7, 1, 6; V 6; P 12.—The middle rays of the dorsal and anal fins exhibit bifurcations of the second degree conspicuously developed. The scales are of moderate development. The body is chestnut brown, and the abdomen yellowish golden, with blackish specks along the middle of the flanks to the caudal fin. The periphery of the scales is margined with black. The dorsal, caudal and anal fins are greyish and speckled, the ventrals and pectorals being olivaceous.

To distinguish this species from its congeners, the name of *G. senilis* is here proposed.

On the Primary Divisions of the SALAMANDRIDÆ, with Descriptions of Two New Species.

BY E. D. COPE.

Class AMPHIBIA. Order CADUCIBRANCHIATA. Sub. Ord. URODELA.

Fam. 1. PROTONOPSIDÆ. Branchial apertures persistent. (Trematoderes Dum. & Bibr).

Fam. 2. SALAMANDRIDÆ. Branchial apertures none. (Aretoderes Dum. & Bibr.)

The characters of the following subfamilies are taken from the position, etc., of the palatine and sphenoidal teeth, and we are of the opinion that the groups thus formed will be found to be more natural than those established exclusively upon the form of the tongue.

1. *AMBYSTOMINÆ.*

Palatine teeth upon elevated processes of the vomero-palatine bones, in straight or arched transverse series only, sphenoidal teeth absent. Tongue large, thick, papillose, but slightly free. Form stout. Skin mostly smooth. North America.

1. MEGALOBATRACHUS (Tschudi) 1838. Syn. *Cryptobranchus* Van der Hoeven, 1838. *Sieboldia* Bonaparte, 1850. *Tritomegas* Dumeril & Bibron, 1850.

The great aquatic Salamander of Japan is closely allied to our Protonopsis (Menopoma Harlan), but the absence of branchial slits places it among the true Salamanders. By the position of the palatine teeth it evidently belongs to the present subfamily, and not among the Tritons, as placed by Dr. Hallowell. (Journ. Acad. Nat. Sci., vol. iii. Second Series, p. 357).

2. CAMARATAXIS Nob. Palatine teeth upon four processes, the two posterior short oblique, and behind the internal nares; the anterior forming an arch, interrupted at the palatine suture, and concentric with the maxillary series. Tongue broad, thick, papillose, attached by the whole posterior border, slightly free laterally. Extremities stout, digits free, 4—5. Tail not long, compressed.

C. maculata.—*Ambystoma maculatum* Hallowell, Journ. Acad. Nat. Sci., Second Series, vol. iii. p. 355.

This species, which inhabits New Mexico, makes the nearest approach to the preceding genus in the form of the series of palatine teeth. In this respect it also exhibits too great a departure from the straight or slightly angular series of Ambystoma, to remain in that genus.

3. AMBYSTOMA (Tsch.)

The nearest approach to the preceding species, in general appearance and form of the palatine series, is seen in the Ambystoma nebulosum of Dr. Hallowell; but the processes are not arched, but straight, presenting an obtuse angle forward.

The genus *Xiphonura* Tschudi (*Heterotriton* Gray) does not seem to be sufficiently distinct either with respect to dental peculiarities, or the form of the tail. Though Ambystoma ingens, luridnum, and Californiense resemble each other in these points, and are quite different from the A. opacum, yet by the intervention of such species as A. tigrinum (Green)—fuscum (Hallowell)—bicolor (Hall.)—punctatum (Linn.), which show a regular gradation of form, the hiatus is filled, and no generic division can be made.

The following species appears to be undescribed:

A. conspersum.—Head oval, rather large; extremities slender, fourth toe twice as long as second; tail not longer than body, much compressed; tongue elliptical, very slightly free at the sides; palatine teeth in two short patches between the internal nares, presenting a concavity backwards. Length 1 inch 10 lines: head 4 l.: body 9 l.: tail 9 l. Head, back and tail cinereous brown, finely speckled with white dots, which are confluent on the snout. An indistinct row of white spots on the sides. Beneath dirty white.

Londongrove; Chester Co., Pennsylvania.

The animal described was probably not fully grown, so that though the measurements indicate the smallest known Ambystoma, the adult may be larger. We are unable to refer it as the young of any of our Pennsylvania Ambystomata. The form of the tail would indicate aquatic habits, but it was found in the woods, and when placed in water showed the greatest aversion to it.

It resembles Ambystoma porphyriticum of the Academy's collection, but differs in color of abdomen, lateral series of spots, and larger head and mouth. (We allude to the specimen from the Wabash, presented by Dr. McMurtrie). The two latter points, it will be noticed, are those in which this Wabash specimen differs from Prof. Green's description, according to Dr. Hallowell. (Proc. Acad., Feb. 1856). A. porphyriticum has as yet been found west of the Alleghanies only. The young of A. lateral e (Hall.) is not known, nor has the geographical distribution of that species been well ascertained. We have been unable to find Gray's description of his A. punctulatum, which is, however, a Californian species.

4. ONYCHODACTYLUS (Tsch.)—The genus Ensatina (Gray) which is stated by Dr. Hallowell (Proc. Acad. Nat. Sci. vol. 8, p. 238) to be destitute of sphenoidal teeth, may enter this subfamily.

2. *SPELERPINÆ.*

Palatine teeth in short series upon transverse processes of the palatine bone; sphenoidals numerous, aggregated upon two thin, ovate or elongate bony plates (becoming cartilaginous), which lie longitudinally and contiguously upon the sphenoid bone. Tongue (generally) thin, borne upon the much exserted cartilaginous elongation of the os hyoides; some genera with an additional anterior membranous attachment. Form slender; skin smooth. North America and Europe.

I. PLETHODONTÆ.

Tongue with a membranous attachment from the pedicel to the anterior edge, leaving the lateral and posterior borders more or less free.

1. PLETHODON (Tsch.)—The tongue in this genus is not attached by its posterior border, as described, though very slightly free.

2. DESMOGNATHUS (Baird).—D. auriculata (Holbrook). D. nigra (Green).

D. fusca (Green). *Salamandra quadrimaculata* (Holbrook) is undoubtedly the young of this species.

The teeth of this species—as in all others of the Spelerpinæ that we have examined, are acrodont. Superior and inferior maxillaries slightly curved, compressed; summits truncate, having a cutting edge interiorly, and a sharp point exteriorly, with a crescent-shaped depression between. Color hyaline, point and edge amber. Sphenoidals more cylindrical and incurved.

D. ochrophæa.*—Form more slender than D. fusca, less so than Pleth. erythronotus. Tail as long as the head and body, subquadrangular at base, beyond, slender and slightly compressed. Thirteen distinct costal folds. Length 2 inches 11 l.; tail 17 l.

Color above, varying from bright to dirty and fuscous straw color, most specimens with an indefinite medial row of irregular brown spots, a deep brown line passing through the eye and along the dorso-lateral region of the body to the end of the tail; distinctly defined along its upper edge; fading into fuscous marblings on the sides. Belly pure white.

Susquehanna County, Pennsylvania.

This is a terestrial species, and very common beneath the bark of hemlock logs. We have never noticed it in the South-eastern part of Penna., but it has probably been passed over as Spelerpes bilineata, to which it bears considerable resemblance, or as a pale variety of Plethodon erythronotus. From the latter it differs in attachment of tongue, less slender form, want of marblings on the belly, etc. Brownish yellow takes the place of red on the back, though the young have indications of the same indefinite pink spotting as in that species and Desm. fusca.

3. ANEIDES (Baird.) 4. HEREDIA (Girard.) 5. HEMIDACTYLIUM (Tsch.) Is *Salamandra melanosticta* (Gibbes) identical with *H. scutatum* (Tschudi)?

II. SPELERPEÆ.

Tongue boletoid—attached by a central pedicel only.

6. BATRACHOSEPS (Bp.) 7. SPELERPES (Raf.) 8. ŒDIPUS (Tsch.) 9. GEOTRITON (Bp.)

10. PSEUDOTRITON (Tsch.) The teeth of this species exhibit the following peculiarities. Acrodont, much incurved, cylindrical, with a central pulp

* Since the above was sent to press, we have been informed by Prof. Baird that he considers this animal identical with Salamandra Haldemani (Holbrook) which he is of opinion is one of the "very numerous varieties of Desmognathus fusca." We have never seen Prof. Holbrook's original specimens of S. Haldemani, but it has been represented by all subsequent authors to be a Spelerpes (Cylindrosoma D. & B.), a genus differing from Desmognathus in its boletoid tongue. We would also hazard a doubt as to the identity of this animal with Desm. fusca. The latter is decidedly aquatic in its habits, living beneath stones, etc., in rapid streams.

The former we have never seen in the water, but have invariably found it beneath bark, under logs, etc. It is rather sluggish, resembling Plethodon erythronotus in this respect. Should this animal be the Salamandra Haldemani of Holbrook, it will stand as Desmognathus Haldemani Nob.

cavity, terminating in two points, the interior much larger than the exterior; both of a bright amber color, the body of the tooth being hyaline in appearance. The palatines are similar to the superior maxillaries, the inferior maxillaries only differ in being flattened on their inner side, and the sphenoidals in being more curved.

3. HYNOBIINÆ.

Vomero-palatine bones destitute of teeth, posteriorly elongated and cuneiform, occupying a deep emargination in the outline of the sphenoid bone. Sphenoidal teeth present, upon the outer edge of two ridges of the sphenoid bone which lie along the sphenoido-palatine suture, thus forming two longitudinal series closely approximated posteriorly, widely diverging and becoming transverse, anteriorly. Tongue rather large, much attached. Very aquatic species. Japan.

This subfamily presents a singular and very distinct modification of the arrangement of teeth on the palate.

Tschudi has distinguished generically the only two species of this subfamily, under the names Pseudosalamandra and Hynobius, and apparently upon insufficient grounds. MM. Dumeril and Bibron have united them under the name Ellipsoglossa, but as Tschudi's names have priority, one or the other of them must be adopted. We select as the least objectionable

1. HYNOBIUS (Tsch.) H. n e b u l o s u s (Schl.) H. n a e v i u s (Schl.) *Pseudosalamandra nævia* Tsch. Class. 1838. *Molge striata* Gray, Cat. Brit. Mus. 1850.

4. *SALAMANDRINÆ.*

Palatine teeth upon the inner edge of processes of the palatine bones, which are elongated horizontally and posteriorly over the sphenoid. No transverse palatine series. Tongue generally thick, and seldom free to much extent. Skin mostly rough, or changing with the habitat. Form usually stout. Europe, North America and Japan.

It would appear as though herpetologists had not given the same attention to the clear definition of their genera among the animals of this subfamily, as elsewhere. In the following brief synopsis, the diagnoses of the genera have been drawn up with reference to and including only the *distinctive* characters.

I. SALAMANDRÆ.

Palatine processes slender, curved, approximating posteriorly. Ribs not developed. Terrestrial species.

1. SALAMANDRA (Laurenti.) Palatine teeth in two curved series, approximated posteriorly. Tongue oval, thick, slightly free at its edges. Digits free, 4—5. Parotids large, porous. Tail moderate, cylindrical.

S. m a c u l o s a (Laurenti.) S. c o r s i c a (Savi.) S. a t r a (Laurenti,) 1768. S. n i g r a, Gray, Cat. Brit. Mus. 1850.

II. PLEURODELÆ.

Palatine processes cuneiform. Ribs greatly developed, sometimes piercing the skin. Terrestrial and aquatic.

2. SALAMANDRINA (Fitzinger.) Palatine series nearly in contact at their anterior extremities, for a short distance almost parallel, then widely diverging. Tongue ovate, broad behind, free laterally and posteriorly. Digits 4—4. Tail subcylindrical.

S. p e r s p i c i l l a t a Fitz. 1826. *Seiranota condylura* Barnes, Sillim. Journ. v. ii. p. 278.

3. PLEURODELES (Michaelles.) Palatine teeth in two parallel se anterior extremities are considerably in advance of the

slightly converging. Tongue small, ova[1], free posteriorly and laterally. Parotids present, porous. Digits 4—5. Tail long, compressed.

P. Waltli (Mich.)—*Salamandra pleurodeles*, Schlegel, Fauna Japonica, p. 117. ? P. exasperatus (Dum. & Bibr.) Erp. Gen. vol. 9, p. 420.

4. Bradybates (Tschudi.) Palatine teeth few. Tongue small, round, attached by its whole inferior surface. Extremities short, small; digits 4—5. Body depressed, no parotids. Tail short, broad at base, subcylindrical.

B. ventricosus (Tsch.)

III. Tritones.

Palatine processes cuneiform. Ribs not developed. Habits aquatic, many species furnished in the breeding season with dorsal crests, and interdigital membranes.

5. Glossoliga (Bp.)—Longitudinal series of palatine teeth in two widely separated rows, slightly converging anteriorly. A strong postorbitar arch, formed by the union of a process of the posterior frontal with that of the tympanic bone. Maxillary bone uniting immediately with the pterygoids. Tongue rounded, free posteriorly and laterally. Digits 4—5. Tail moderate, somewhat compressed.

A remarkable genus, quite distinct in many points of structure from Euproctus, with which Dum. & Bibron unite it.

G. Poireti (Gervais.)

6. Diemyctylus (Rafinesque.)—Longitudinal series of palatine teeth in two straight rows, closely approximated anteriorly, widely diverging posteriorly. A strong long arch above and behind the orbit formed by the united processes of the posterior frontal and tympanic bones. Tongue small, thick, oval, attached by its whole inferior surface or with a very slightly free lateral border. Digits 4—5, the exterior and interior upon the hind feet rudimentary. Tail moderate, compressed.

Syn. *Diemyctylus* Rafinesque, 1820. *Notopthalmus* Raf., 1820. *Cynops* Tsch. 1838. *Taricha* Gray, 1850.

We regret that the law of priority compels us to employ Rafinesque's objectionable name in preference to *Cynops* Tschudi or *Taricha* Gray. We prefer *Diemyctylus*, though apparently unmeaning, to the egregiously inappropriate *Notopthalmus* of the same date.

D. torosus.—*Triton torosus* Esch. Zool. At. pt. v. pl. 21. fig. 15, 1833. *Triton Ermanni* Weigmann, 1835. *Triton granulosus* Skilton, 1849. *Taricha torosus* Gray, Cat. Brit. Mus., 1850.

The external characters of this animal present no peculiarity that appears to us to warrant generic separation from the succeeding species.

? D. lævis.—*Taricha lævis* Bd. & Girard, Proc. Acad. Nat. Sci. vol. 6, p. 302.

D. pyrrhogaster.—*Molge pyrrhogastra* Boie, Isis, p. 215, 1826. *Salamandra subcristata* Schlegel, Fauna Japonica, p. 135, 1833. *Cynops subcristatus* (Tsch) Class. der Batrachier, p. 94, 1838.) *Cynops pyrrhogaster* (Gray,) Cat. Brit. Mus. 1850.

This species in the development of the temporal region exhibits characters most typical of the genus. We fail to perceive the generic difference admitted by authors to exist between this and the following species.

D. viridescens.—*Triturus* (*Diemyctylus*) *viridescens* Raf., 1820. *Triturus* (*Notopthalmus*) *miniatus* Raf., 1820. *Salamandra symmetrica* Harlan, 1825. *Salamandra dorsalis* Harlan, 1828. *Salamandra millepunctata* Storer, 1838. *Triton millepunctatus* Dekay, 1842. *Triton dorsalis* Hall., 1842. *Triton symmetricus* Dum. & Bibr., 1854.

We include in the above synonymes those of the nominal species D. miniatus, which we think with Dr. Hallowell (Proc. Acad. Nat. Sci. Feb. 1856) is a state of D. viridescens. We have caught specimens with or

without the dorsal or ventral spots; destitute of, with rudimentary, or fully developed crests; and of every shade of color between vermillion and brownish green. The color and character of the skin seem to be dependent upon the amount of moisture in the situations in which they are found. Those from high and dry spots are redder and rougher than those from marshy situations: while those whose habits are for the time aquatic, are still greener and smoother, and exhibit every degree of development of the dorsal crest. Thus it is probable that this species undergoes changes similar to those of the European Tritons, as detailed by Schlegel and Kaup.

7. EUPROCTUS, (Gené.)—Series of palatine teeth closely approximated anteriorly, posterior extremities widely diverging. Skull elongated, depressed. A weak post orbitar arch formed by the slender processes of the posterior frontal and tympanic bones. Superior maxillary bone uniting with the pterygoid by the intervention of a jugal bone. Tongue oval, free behind and at the sides. Anal region frequently prolonged. Digits 4—5. Tail compressed.

E. platycephalus (Otto.)—*Molge platycephalus* (Otto.) 1826. *Euproctus Rusconi* (Bonaparte), 1839. *Euproctus platycephalus* (Gray,) 1830. *Euproctus puncticulatus* (Dum. & Bibr.)

This and the following three species have been described by MM. Dum. & Bibron as Tritons, but are considered by M. Alfd. Duges (Osteologie et Myologie des Batraciens) as varieties of Euproctus platycephalus. The present species is evidently a Euproctus, judging from the figure of the skull in the Erpetologie generale.

E. rugosus (D. & B.) E. repandus (D. & B.) E. Bibronii (Bell.)

8. LISSOTRITON (Bell.)—Series of palatine teeth nearly in contact anteriorly, widely diverging posteriorly. Post orbitar arch wanting; posterior frontal bone with a slight projecting supra-orbitar border. Tongue moderate, circular, depressed, slightly free all round. Digits 4—5. Tail compressed.

L. punctatus (Latr.)—*Triton punctatus* Auctorum. *Lissotriton punctatus* Bell, 1839. *Lophinus punctatus* Gray, 1850.

The form of the tongue seems to be the only peculiarity which separates this species from the true Tritons. This, though a slight character, is probably better than that upon which Prof. Bell principally relies in establishing the genus—viz.: the smoothness of the skin:—thus including the Triton palmipes, and perhaps other species at *proper seasons* of the year.

9. TRITON (Laurenti). Series of palatine teeth closely approximated anteriorly, diverging posteriorly. Supra-orbitar border of the posterior frontal bone prominent; the process rudimentary or wanting. Tongue small papillose, free at the sides only. Digits 4—5. Tail moderate, compressed.

? OMMATOTRITON (Gray). Tongue thick, like a wart, lateral borders scarcely free.

Syn. *Ommatotriton* Gray, (1850). *Lissotriton* (Bell) (Pars), 1839. *Lophinus* (Gray), (Pars) 1850.

T. palmipes (Latreille)? *Molge vittatus* Gray, (1820). *Lissotriton palmipes* Bell, (1839). *Triton vittatus* Dum. & Bibr. (1854).

T. alpestris (Laur.)

T. palmatus (Schn.) (1797). *Lophinus palmatus* (Gray), 1850.

? TRITON (Laurenti). Tongue depressed, considerably free laterally.

Syn. *Triton* (Laur.) Syn. Rep. p. 38, (1768). *Hemisalamandra* (Pars) (Duges), (1852).

T. marmoratus (Latreille). This species stands first in Laurenti's Synopsis of Tritons. In the form of the tongue it approaches, and in osteological characters closely resembles, the Hemisalamandra cristata, but the almost parallel rows of palatine teeth in the latter species generically distinguish it.

10. HEMISALAMANDRA (Duges), (1852). Palatine teeth in two widely sepa-

rated longitudinal rows, which slightly converge anteriorly. Post-orbitar arch wanting. Tongue oval, flat, attached by its anterior and posterior borders, free laterally. Digits 4—5. Tail long, compressed.

H. cristata (Laur.) *Triton cristatus* Auctorum. What species Merrem assigned as the type of his genus Molge, we have been unable to ascertain, nor would it seem to be generally well known among herpetologists, from the number and variety of species to which it has been applied. The following are some of them:—Plethodon erythronotus, Hynobius nævius, Euproctus platycephalus, Triton palmipes, Diemychylus pyrrhogaster.

On the genus CALLIONYMUS of Authors.

BY THEO. GILL.

In the genus *Callionymus*, as it has been restricted by modern naturalists, three distinct genera are yet confounded. Sharing all of the following characters, two of them differ so much from each other in the position of the branchial apertures, that there can be no doubt of their claims to rank as separate genera. The characters common to all, and which distinguish them as a subfamily, will be first given, and afterwards the generic diagnoses.

The body is elongated, and often transversely oval anteriorly, and consequently broader than high; thence it gradually declines in height and thickness to the base of the caudal fin, and being often quite thick near that fin, assumes there a peculiar bulging appearance. The whole is naked and smooth.

The lateral line commences at the mastoids, and is connected, near its origin, to that of the opposite side by a transverse nuchal line; thence it generally declines slightly, and is then continued along the side of the back or the upper part of the side to the caudal fin.

The head is in general outline depressed and triangular, but varies in detail. The preopercle has a stout horizontal process which generally terminates posteriorly in a group of radiating and recurved spines, one above the other, or which has the spines along the superior border. The profile is oblique. The preorbitals or first sub-orbitals are prolonged anteriorly and frequently extended towards each other, thus forming a roof under which the jaws are concealed when retracted. There appears to be on each side but a single nostril, which is situated before the eye.

The mouth is small and sub-terminal, but under the muzzle, and is protractile downwards.

The teeth are villiform, and present in a moderately broad band in each jaw. The palate is smooth.

The tongue is generally far within the mouth; it is sometimes entirely united to the floor of the mouth, while at other times it is anteriorly free.

The branchiostegal membrane has on each side five or six slender rays.

The branchial apertures are very small and superior.

The first dorsal fin commences before the bases of the pectorals; it varies in shape, but there appears to be a constant arrangement of the rays. These are always four in number, and the first two are approximated at the base, but as the membrane enlarges, diverge from each towards their ends; the third is considerably posterior: the fourth is separated by a still wider interval from the third.

The second dorsal commences a short distance behind the first, is oblong and is distant from the caudal less than its length.

The anal has the form and structure of the second dorsal, but its commencement and termination are posterior to those points of the dorsal.

The caudal is elongated, but narrow, and has only from ten to thirteen articulated rays, of which from one to three of the superior and inferior are simple.

The pectoral fins are well developed, and are angular at the middle of their posterior margins. Their bases are vertical, but concave.

The ventrals are on the sides of the breast, and their bases are parallel or nearly so with the fish's length: they are separated from each other by a very wide and flattened area, and their posterior rays are connected by a membrane to the lower half of the bases of the pectoral fins. These fins are more or less larger than the pectorals.

Such are the chief external characters of this singular group, and as they are apparently common to all its species, they should in this case be eliminated from the generic, and much more from the specific description. The different proportions of these parts are their relative situation to each other, are alone specific characters. The fins present a singular diversity, not alone in form, but in structure, in even the same species. Some of them, especially the first dorsal and caudal, are often much more developed in the males than in the females. The rays, at least of many of them, are very variable in their character, sometimes nearly all them being simple, and at others, almost all are branched. It is therefore impossible to now give a formula indicative of the exact permanent condition of the fins.

Two of the genera confounded under the name of *Callionymus*, as has been already stated, differ chiefly in the position of the branchial apertures. In the true *Callionymi*, they are of an oval form, and situated near the inner angle of the superior opercular margin, and on the sides of the nape. In another group, they are present as small perpendicular slits behind the opercular margin, and have been well described by Valenciennes in the article on *Callionymus opercularis*. They are by that naturalist said to be concealed by a long pointed production of the operculum, and by a membrane which connects this production to the nape, and they thus present the appearance of transverse slits under this membrane when the opercula are raised up. Valenciennes has well remarked that the species whose peculiarity he thus describes may one day become the type of a peculiar sub-genus, but he has not so named it. There can be at this day no doubt entertained as to the propriety of forming for the species thus distinguished a distinct genus, and the name of *Synchiropus* is offered as its generic appellation, a name which alludes to the peculiar connection of the ventrals to the bases of the pectorals. The genus that will be described under this name does not embrace the *Callionymus dactylopus* of Bennet which is the type of a distinct, but allied genus.

The generic diagnoses of the genera will then be as follows:

I. Callionymus, L. restr.

Aperturæ branchiales ovatæ, in latere nuchæ utroque sitæ. Pinnæ ventrales spina et quinque radiis ramosis, omnibus membrana conjunctis.

This genus, as far as relates to the species referred to it, is synonymous with the genus *Uranoscopus* of Gronovius, who has reversed the Linnæan names of *Callionymus* and *Uranoscopus*, as used by modern naturalists, the former Gronovian genus including the *Uranoscopi* and the latter the *Callionymi*.

Besides the numerous species that have been already described, two that appear to be undescribed are in the collection of the North Pacific Exploring Expedition. One (*C. tæniatus* Gill,) is lilac colored, with a silvery line and row of spots on the sides, and with a black spot, bordered by white, on the first dorsal. The other (*C. inframundus* Gill,) is light brownish, marbled with white, and with a blackish first dorsal. The former is from China; the latter from Japan.

II. Synchiropus, Gill.

Aperturæ branchiales parvæ, lineares, fere perpendiculares, post opercula. Pinnæ ventrales radiis spinoso et quinque ramosis membrana conjunctis.

The genus thus characterized embraces five known species, which are all inhabitants of the Eastern seas:

1. S. lateralis.

Syn. Callionymus lateralis, Richardson, Zoology Sulphur, p. 65, pl. xxxvii, figs. 5 and 6. 1844.

The specimen figured by Richardson is a female. The male is distinguished by a more slender and elongated body, and by a first dorsal, about a third higher than that of the female. The first dorsal has also a black spot margined with white at the posterior angle, and the two bars of the caudal which are present in the female are absent in the male. There are also two rows of blue spots on the anal of the female, which are not mentioned in Richardson's descriptions: these spots are replaced in the males by two corresponding lines. Richardson simply states that his fish has a narrow streak of dusky brown near the lower border of the anal. There can, however, be no doubt as to the specific identity of these three varieties. Mr. Stimpson dredged specimens at Hong Kong from a depth of eight fathoms.

2. S. lineolatus.

Syn. Callionyme lineolo, } Val. Hist. Nat. des Poissons, vol. xii. p.
Callionymus lineolatus. } 307. 1837.

This species is quite distinct from the preceding, which has been compared with it by Sir John Richardson.

3. S. ocellatus.

Syn. Callionymus ocellatus. Pallas, Spicilegia Zoologica, Fasc. octav. p. 26, pl. iv. figs. 1, 2, 3. 1770.

(Callionime,) l'œille Daubent. Enc. Method. vol. 3, Poiss. pp. 75, 277. 1787.
Le petit Argus, } Bonnaterre Tableau Encyc. Method., Ichthyologie,
Callionymus ocellatus, } p. 43. 1788.
Callionymus ocellatus, Artedi Genera Piscium, Walb. ed. p. 608. 1792.
" " Linn. Systema Naturæ, Gmel. ed. p. 1154. 1793.
Callionyme pointillè, } Lacepede Hist. Nat. des. Poissons, vol. 2, pp.
Callionymus punctulatus, } 328, 340. 1800.
Callionymus ocellatus, Bloch Systema Ichthyologiæ Schneid. ed. p. 40. 1801.
Callionyme ocelle, } Val. Hist. Nat. des Poissons, vol. 12, p. 309.
Callionymus ocellatus, } 1837.
Callionymus ocellatus, Blkr. Natuurk. Tijd. v. Ned. Ind. vol. 8, p. 422. 1855.

4. S. opercularis.

Syn. Callionyme a grand opercules, } Val. Hist. Nat. des Poissons, vol.
Callionymus opercularis, } 12, p. 305. 1837.

5. S. opercularoides.

Syn. Callionymus opercularoides, Blkr. Natuurk. Tijd. v. Ned. Ind. vol. 1, p. 32. 1850.

A third genus with the branchial apertures in the same position as *Synchiropus*, is readily distinguished from that genus, as well as from the true *Callionymi*, by its first articulated ray; this ray is unbranched and much longer than the following, from which it is almost entirely separated, and is only connected with the spinous ray. To the only known species, the name of *Callionymus dactylopus* has been given. As the specific name alludes to the principal generic character, and is also much more appropriate as a generic than a specific one, it is now conferred on the genus, and the name of its author is given as a specific one.

III. Dactylopus, Gill.

Aperturæ branchiales parvæ, lineares, post opercula. Primæ ventrale radiis spinoso et quinque articulatis, radio primo articulato simplici, elongato, radio spinoso conjuncto, a radiis ramosis disjuncto. Pinna dorsalis prima spinis duobus primis filiformibus, longissimis, aliis filiformibus sed brevioribus.

1. D. Bennetti.

Syn. Callionyme a doigt libre, } Val. Hist. Nat. des Poissons,
Callionymus dactylopus, Ed. Benn., } vol. 12, p. 310. 1837.
Callionymus dactylopus, Blkr. Naturuk. Tijd. v. Ned. Ind. vol. 3, p. 559. 1852.

Description of HYPORHAMPHUS, a New Genus of Fishes allied to Hemirhamphus, Cuv.

BY THEO. GILL.

All those species of fishes which resemble in external form the *Esox Brasiliensis* of Linnæus, and for which Cuvier framed the genus *Hemirhamphus*, have been described as having a straight band of short, granular and equal teeth in each jaw.* Such is the character given to the genus by Valenciennes, in the nineteenth volume of the "Histoire Naturelle des Poissons," where twenty-seven species are referred to it. This character is also repeated in many of the specific descriptions, and many of the species are distinguished by the more or less small size of the teeth. Had any other form or system of dentition existed, it could therefore scarcely have been overlooked by the distinguished French naturalist. It is with much pleasure that I now submit to Ichthyologists the description of a fish which resembles in almost every feature, the known species of *Hemirhamphus*, but which have in each jaw a band of distinctly tricuspidate small teeth. Two specimens are in the collection made by the author, at the island of Barbadoes. Owing to an unfortunate accident, the specimens are in poor condition—the scales being mostly rubbed off and the fins more or less broken. I am unable, therefore, to furnish at present as full a discription as could have been wished.

Hyporhamphus Gill.

Body elongated, very slowly decreasing in height to the dorsal. Scales large, each with a subcentral nucleus and delicate concentric striæ. Head elongated, conical in profile, broad and flattened above. Lower jaw forming an elongated, slender and depressed bill. Upper jaw short and acutely rounded. Teeth small, distinctly tricuspidate, and with the median cusp largest, in a moderate band on each jaw. Dorsal and anal fins posterior and opposite each other, each oblong and simple. Caudal fin moderate, emarginate. Pectoral fins moderate. Ventral fins subcentral, small or moderate. Ventral carina distinct on each side. Tongue thin, moderate, rounded anteriorly, with parallel sides, and with a median groove, free before and on the sides.

H. tricuspidatus, Gill.—The greatest height equals an eleventh of the extreme length, from the point of the lower jaw to the end of the caudal fin; the greatest breadth exceeds three-fifths of the height. The head, inclusive of the lower jaw, forms more than three-tenths of the extreme length. The lower jaw, from the tip to the corner of the mouth, constitutes a fifth of the same length, and is five times larger than the upper jaw. The radial formula appears to vary. In a small specimen it is as follows:—D 14, A 17, C 4, I 6, 7, I 4, P 11, V 6.

In a large one—D 15, A 16, P 10.

They are both too much damaged to retain the true colors. The broad silvery band is present as usual, and widest posteriorly. The upper part of the dorsal is blackish.

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* I have not been in a position to consult the "Catalogue of Malayan Fish," in the eighteenth volume of the Journal of the Asiatic Society of Bengal, where Cantor has described a "*Hemirhamphus tridentifer*." That species may possibly belong to the genus now described, although the teeth of *Hyporhamphus* would be very improperly compared to tridents. The specific name may, however, only allude to the three denticles of each tooth.

On DACTYLOSCOPUS and LEPTOSCOPUS, two New Genera of the Family of Uranoscopidæ.

BY THEO. GILL.

Dactyloscopus Gill.

Body elongated, with the dorsal and abdominal outlines slowly converging to the caudal fin. Scales large, regularly imbricated. Lateral line straight, and running along the middle of the side. Head oblong, subcubical and smooth. Preopercle entire, opercle radiatedly fringed behind. Mouth nearly vertical. Tongue thick, narrowed anteriorly, attached to the floor of the mouth. Labial velum without a barbel. Anus a short distance behind the base of the pectoral fins. Dorsal fin subequal, single and very long, commencing above or before the anus, and continued almost to the base of the caudal. Anal fin commencing behind the anus, and with the same form and termination as the dorsal. Caudal fin small and narrow, posteriorly subtruncated. Pectoral fins subangular. Ventral fins jugular, closely approximated, and each with three stout simple and articulated rays.

D. tridigitatus Gill.—The head from the snout to the margin of the *opercle* forms about a fifth of the extreme length.

The greatest height is equal to a seventh of the same. The caudal fin forms an eighth. The dorsal commences over the lower angle of the base of the pectorals, or immediately before the margin of the operculum.

D 40, A 34, C 1, 5, 5, 1, P 13, V 3.

The color, as far as preserved, is gray, marbled with white.

Three specimens were obtained by the describer at the island of Barbadoes. The largest is slightly more than three inches in length. They are all in a bad state of preservation.

This is a most interesting genus, from the unusual combination of the characters which it presents. From all the species that have been hitherto referred to the genus *Uranoscopus*, it is at once distinguished by the entire absence of teeth on the palatine arch, and by the presence of only *three rays* to each of the *ventral* fins. Notwithstanding these anomalous characters, it presents so close a resemblance in general form to a species that has been described by Sir John Richardson, as *Uranoscopus macropygus*, that it might readily be referred to the genus by a casual observer. The same smooth head, the same gradually tapering body, the long dorsal and anal continued to the base of the caudal, the regularly imbricated scales, the straight and median lateral line, and the fringed operculum, are seen in both genera. In most of these characters, the two fishes are unlike any of the other *Uranoscopi*. *Dactyloscopus* is again distinguished from the so-called *Uranoscopus macropygus*, besides the two characters that have been already pointed out by the relative length of the dorsal and anal fins, and by the relative situation of the ventrals to each other. In the first described by Richardson, the anus is even more forward than in the West Indian species, and the anal fin commences immediately behind. The dorsal begins at some distance behind the nape, and over the sixth or seventh anal ray. The ventrals are also seperated from each other by a wide interval. In the genus *Dactyloscopus* the dorsal commences above the lower angle of the pectorals, and therefore considerably in advance of the anal fin. The ventrals are also closely approximated to each other, and in this respect, resemble the typical *Uranoscopi*. *Uranoscopus macropygus* has a smaller operculum than *Dactyloscopus tridigitatus*, and this operculum is also triangular and fringed along its upper margin. The former species having been placed in the genus *Uranoscopus*, it is, of course, to be understood that it is provided with teeth on the vomer and palatine bones. As it is advisable that it should be erected into a distinct genus, the name of *Leptoscopus* is now conferred on it, and the *comparative* characters of the two genera are herewith given.

I. DACTYLOSCOPUS Gill.

Dentes palatini et vomerini nulli. Pinnæ ventrales radiis tribus articulatis, approximatæ. Pinna dorsalis ante anum incipiens.

D. tridigitatus.

Hab.—Caribbean sea.

II. LEPTOSCOPUS Gill.

Dentes palatini et vomerini. Pinnæ ventrales distantes, radiis spinosis et quinque ramosis. Pinna dorsalis post anum incipiens.

L. macropygus.

Syn. *Uranoscopus macropygus* Richardson, Zoology Erebus and Terror, Fishes, p. 55, pl. 33, figs. 4, 5, 6, 1846.

Hab.—Australia.

The first two characters given in each of the above generic diagnoses, are in this case of more than generic importance. Had either of them existed alone, the genera might *possibly* have been naturally placed in the same tribe or subfamily. Combined as they are, they appear to be unquestionably the indices of distinct groups. *Dactyloscopus* is therefore placed as the type of one subfamily,—*Dactyloscopinæ*, and *Leptoscopus* of another—*Leptoscopinæ*. Notwithstanding the abnormal and blennoid structure of the ventrals, and the absence of the vomerine or palatine teeth, the *Dactyloscopinæ* appear to be almost as much related to the *Leptoscopinæ*, as the latter are to the *Uranoscopinæ*, properly so called. The comparison between the two former has been instituted on account of their close external resemblance, and not because they are believed to be very nearly allied to each other.

Catalogue of Birds collected on the Rivers Camma and Ogobai, Western Africa, by Mr. P. B. Duchaillu, in 1858, with notes and descriptions of new species.

BY JOHN CASSIN.

(Continued.)

129. LAMPROCOLIUS SPLENDIDUS, (Vieill.)

Turdus splendidus, Vieill. Ency. Meth. i. p. 653.

Lamprotornis chrysonotis, Sw. B. of W. Afr., i. p. 143, (1837.)

Sw. B. W. Afr. i. pl. 6.

Apparently a common species in the country on the banks of the Camma and Ogobai. ♂ young. Upper parts lustrous metallic green, under parts dull black with a few lustrous green and purple feathers on the flanks and under tail coverts.

130. LAMPROCOLIUS PURPUREICEPS, (J. and E. Verreaux.)

Lamprotornis purpureiceps, J. and E. Verreaux, Rev. et Mag. Zool., 1851, p. 418.

Specimens from the Ogobai and Rembo, and formerly from the Muni and Moonda.

131. HYPHANTORNIS TEXTOR, (Gmelin.)

Oriolus textor, Gm. Syst. Nat. i. p. 392.

Buff. Pl. Enl. 375, 376. Sw. Zool. Ill., i. pl. 37.

Specimens from the Camma and Ogobai, and formerly from the Moonda, are not to be distinguished from others in the Acad. Coll. from Gambia. This species appears to be common in Equatorial Africa.

132. HYPHANTORNIS CINCTUS, nobis.

Resembling *H. textor*, but smaller and with a wide transverse band of chestnut on the breast. ♂ Head and throat black, which color ends in a point on the breast, upper part of body greenish yellow, feathers on the back black at base, quills and upper coverts of wings brownish black edged with yellow, uni-

form with the back, tail uniform yellowish green, all the feathers edged with yellow. Wide band on the breast chestnut, extending somewhat on the sides, and in a narrow band around the back of the neck, abdomen and under tail coverts yellow, axillaries yellow, under wing coverts brownish black, tipped and edged with yellow. Bill bluish black, feet light colored. ♀ Head above yellowish green, throat, cheeks and line over the eye greenish yellow, upper parts of body ashy brown, all the feathers edged with a paler shade of the same color, quills and wing coverts brownish black edged with pale greenish yellow. Under parts dull ashy white, tinged with pale brownish on the breast, tibiæ and under tail coverts pale yellowish white, bill light bluish brown, under mandible paler, feet light colored.

Total length about 6 inches, wing $3\frac{1}{4}$, tail $2\frac{1}{4}$ inches. Female, total length about $5\frac{3}{4}$ inches.

Hab.—Camma River, Western Africa. Discovered by Mr. P. B. Duchaillu.

The present and the preceding species are strictly of the same subgeneric group, and resemble each other in colors and general characters, but the present bird is strongly characterized by the large space of chestnut color on the breast, which assumes the form of a wide transverse band, and is uniformly presented in several specimens in the collection from the Camma. It is smaller than the preceding.

This bird seems to be nearly related to *Ploceus collaris*, Vieillot, Nouv. Dict. xxxiv., p. 129, Ency. Meth. ii. p. 699, but has not the tail feathers black, as stated in all descriptions of that species, nor the breast rufous as stated also, and differs in other characters. It also appears to be related to *P. capitalis*, Lath. Gen. Hist. vi., pl. 94, but not so closely as to render it necessary to point out distinctive characters.

133. HYPHANTORNIS FLAVIGULA (Hartlaub.)

Ploceus flavigula, Hartl. Rev. Zool., 1845, p. 406.

Hyphantornis Grayi, Verreaux, Rev. et Mag. Zool., 1851, p. 514.

Specimens in all of Mr. Duchaillu's collections agreeing precisely with the descriptions above cited are constantly labelled as males and females of the same species. It is apparently the most abundant bird of this group in Equatorial Western Africa. Specimens from the Ogobai and Rembo, and formerly from the Muni, Moonda and Cape Lopez.

134. HYPHANTURGUS PERSONATUS, (Vieillot.)

Ploceus personatus, Vieill.

Ploceus melanotis, Swains. Anim. Menag.

Vieill. Gal. ii. pl. 84. Jard. Contr. 1849, pl. 7?

Two specimens only from the Camma present some differences compared with numerous others in the Acad. Coll. from more northern localities, "Senegal," "Gambia," &c., but may not be distinct. A careful investigation might, however, be a good investment for an enterprising ornithologist.

Jardine's figures, cited above, represent nothing accurately with which I am acquainted, and seem, moreover, to have been prepared from specimens preserved in alcohol, which is especially liable to change yellow colors. The species may not be the present.

135. [illegible] ERYTHROPS, (Hartlaub.)

[illegible]s erythrops, Hartl. Rev. Zool., 1848, p. 109.

[illegible]apitata, DuBus. Bull. Acad. Brussels, 1855,

[illegible]list. Soc. Hamburg, 1848, pl. 8.

[illegible]cimens of both sexes and various ages are in the collection [illegible] and formerly from the Moonda. The description and figures [illegible]bove cited, are of the female and young male, but the adult [illegible]nd the young are accurately described by him in Orn. W. [illegible]dult male has the entire head red, which color in the young [illegible]s the frontal and other plumage at the base of the bill.

[April,

136. NIGRITA CANICAPILLA, (Strickland.)
Aethiops canicapillus, Strick., Proc. Zool. Soc. London, 1841, p. 30.
Fraser, Zool. Typ. Birds, pl. 48.
Specimens labelled as males only from the Camma and Moonda. The adult male is described and figured as above.

137. NIGRITA LUTEIFRONS, J. and E. Verreaux.
Nigrita luteifrons, Verr. Rev. et Mag. Zool., 1851, p. 420.
Strictly congeric with the preceding, but smaller. All the specimens in the present collection are labelled as males, which in its adult plumage is described by Messrs. Verreaux as above.
Young ♂. Entire plumage bluish cinereous or plumbeous, paler on the under parts of the body. Wings and tail black, under tail coverts tinged with pale rufous. No trace of the black of the under parts of the body which is in the adult bird. From the Camma.

138. NIGRITA FUSCONOTA, Fraser.
Nigrita fusconota, Fras. Proc. Zool. Soc., London, 1842, p. 145.
Fraser, Zool. Typ. Birds, pl. 49.
Some exercise of the imagination is required in rating this bird in the same genus as the two preceding. The male is figured as above, and that sex only is represented in the present collection from the Camma. A single specimen was formerly received from the Moonda.
This bird probably belongs to a group of which, perhaps, *Estrelda* is the type, and seems to represent a subgenus, or perhaps a genus, certainly quite distinct from *Nigrita*.

139. NIGRITA BICOLOR, (Hartlaub.)
Pytelia bicolor, Hartlaub, Cat. Bremen Mus., p. 76.
Nigrita bicolor, Sclater Jard. Contr. 1852, p. 34, pl. 83.
Scarcely of this genus, but more nearly related to the immediately preceding. This species is in Dr. MacDowell's collection from St. Paul's river, and it has now been received in several of Mr. Duchaillu's collections.
Specimens labelled as of both sexes are much alike, and the adult bird is intended to be represented in the plate above cited, but the bill is given too short and entirely erroneously. The bill is somewhat lengthened, with the commissure curved.
Young ♂. Upper parts dull ashy brown, darker on the rump and upper tail coverts, neck before and breast dull reddish ashy brown, abdomen and under tail coverts clear ferruginous. Wings and tail brownish black. From the Camma and formerly from the Moonda.

140. SYCOBIUS CRISTATUS (Vieillot.)
Malimbus cristatus, Vieill.
Tanagra malembica, Daud. Ann. Mus., Paris, ii. p. 148, pl. 10.
"Sycobius nigrifrons, Temm." Hartl. Cat. Jour., 1855, p. 356.
Shaw Nat. Misc. pl. 581, Vieill. Ois. Chant. pl. 42.
Several specimens of both sexes from the Camma and formerly from the Muni.

141. SYCOBIUS MALIMBUS, (Temminck.)
Textor malimbus, Temm.
Ploceus rubricollis, Swains. An. Menag., p. 306.
Malimbus cristatus, Vieill. (female).
Vieill. Ois. chant. pl. 43.
One specimen only from the Camma, and another was
Cape Lopez. Appears to be a distinct species and is at
Euplectes rufovelatus, Fraser, Zool. Typ. pl. 46.

142. SYCOBIUS SCUTATUS, Cassin?

Sycobius scutatus, Cassin, Proc. Acad. Philada. 1848 p. 67?

Jour. Acad. Philada. i. pl. 41, fig. 1, 2.

A single specimen, from the Ogobai. This and another formerly received from Cape Lopez are not in mature plumage, but much resemble the species designated.

143. SYCOBIUS NITENS (J. E. Gray).

Ploceus nitens, J. E. Gray, Zool. Misc., p. 7, (1842.)

Gray, Gen. i. pl. 87, fig. 2.

Numerous specimens from the Camma and formerly from the Muni and Moonda.

144. SYCOBIUS NIGERRIMUS (Vieillot).

Ploceus nigerrimus, Vieill.

Ploceus niger, Swains. An. Menag. p. 306.

Several specimens from the Camma and formerly received from the Moonda and Cape Lopez. Perhaps not properly of this genus, the green color of the young approximating it to *Ploceus* and *Hyphantornis*.

145. VIDUA PRINCIPALIS (Linnæus.)

Emberiza principalis, Linn. Syst. Nat. i. p. 313.

Vidua erythrorhynchus, Swains. B. of W. Afr. i. p. 176, pl. 12.

Buff. Pl. Enl. 8, fig. 2. Vieill. Ois. Chant. pl. 36. Edwards' Bird, vi. pl. 270, fig. 2.

Numerous specimens, but generally in young plumage. From the Ogobai and formerly from the Moonda. The adult male of this species is described and figured as above, but Edwards' figure represents rather an immature plumage.

♂ young. Entire plumage dull brown, without stripes or spots, paler on the under parts and nearly white on the throat. Bill yellow or red at base and tipped with black. Tail short.

♀ adult. Upper parts striped longitudinally with brownish black and dull light ferruginous, under parts ashy white, tinged with dull reddish on the breast. Tail short, tertiary quills nearly as long as the primaries. Total length about 4¼ inches, wing 2¼, tail 1¾ inch.

146. COLIOSTRUTHUS MACROURUS, (Gmelin.)

Loxia macroura, Gm. Syst. Nat. i. p. 845.

Fringilla flavoptera, Vieill.

Vidua chrysonota, Swains. B. of W. Afr. i. p. 178.

Buff. Pl. Enl. 183, fig. 1. Vieill. Ois. Chant. pl. 41.

This is a most anomalous and multiform species at different ages, and might very readily be mistaken for several distinct birds. Vieillot, as above, represents the adult male, which is well described by various authors; Buffon's figure seems to be intended for this bird, but if so, is a failure.

♀ adult? Tail short, entire upper parts dull ashy brown, every feather having a central longitudinal stripe of brownish black, which stripes are wider on the back. Under parts dull white, tinged with dull yellowish on the breast and the feathers on the breast and sides having a few longitudinal stripes of dark brown. Wings and tail dark brown, coverts at the shoulder edged narrowly with yellow, bill and feet light colored. Total length 5 inches, wing 2¾, tail 2 inches.

♂ young. Tail long, shoulders bright lemon yellow, wings and tarsi black. Upper parts of head and body with the feathers black in the middle and widely tipped and edged with dull reddish ashy, under parts dull ashy white, obscurely striped on the breast and sides with light brown. ♂ younger. Tail short, generally resembling the female, but with the upper parts more strongly tinged with dull reddish, and the stripes narrower. Under parts dull and pale greenish yellow, darker on the breast. Bill and feet light colored.

Of the plumage supposed by me to be the adult female and so labelled in the present collection, there may be an error. It is quite possible that the adult female is black, like the male. The female of this species described above is in general appearance not unlike that of some species of *Carpodacus*.

Numerous specimens from the Camma and formerly from Cape Lopez.

147. SPERMOSPIZA GUTTATA, (Vieillot).

Loxia guttata, Vieill.

Vieill. Ois. Chant. pl. 68, (female).

About twenty specimens received from Mr. Duchaillu are all of this species, and are in adult plumage. As yet no specimen of the nearly allied *S. hæmatina* has ever been received in this Academy from Equatorial Africa, though frequent in collections from the Gambia.*

Specimens from the Camma and formerly from the Moonda.

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* The two species of the genus *Spermospiza*, G. R. Gray, singularly resemble each other in general characters, but are quite distinct and recognizable without difficulty.

1. SPERMOSPIZA HÆMATINA, (Vieillot).

Loxia hæmatina, Vieill.

Spermophaga cyanorhynchos, Swains. B. of W. Afr. i. p. 164.

Fringilla pustulata, Voigt.

Vieill. Ois. Chant. pl. 67. Jard. & Selby, Ill. Orn. n. s. pl. 11.

♂ Adult. Chin, sides of neck, cheeks, head above and entire upper parts of body, wings and tail glossy black, frequently tinged with brown, especially on the wings. Throat, neck, breast and sides scarlet, middle of abdomen, tibiæ and under tail coverts black. Bill shining metallic blue, tipped with bright red. Upper tail coverts black, uniform with other upper parts. ♀ Adult. Head above and upper parts of body dark brownish ashy, throat, neck before, breast and sides scarlet, cheeks and forehead dull red, upper tail coverts brick red. Abdomen dark ashy brown, with numerous circular spots of white. ♀ Young. Entire plumage brownish black, lighter on the under parts of the body, and with a few scarlet feathers on the breast, and of dull red on the upper tail coverts.

Total length about 5½ inches, wing 2¾, tail 2½ inches. ♀. Total length 5½ inches.

Hab.—"Senegal." "Gambia." Acad. Collection.

This bird has the cheeks and a narrow space at the base of the under mandible, (or chin) and the rump and upper tail coverts always black in the adult male, by which characters it is easily distinguished from the succeeding. The females of the two species are, however, very much alike, both having the upper tail coverts red or scarlet. In the female of the present bird the circular spots on the abdomen are smaller and more numerous than in the succeeding.

In the Acad. Coll., specimens of this species are from more northern locations than of the succeeding.

2. SPERMOSPIZA GUTTATA, (Vieillot).

Loxia guttata, Vieill. Ois. Chant.

Vieill. Ois. Chant. pl. 68. (♀). Lath. Gen. Hist. v. pl. 87, (♀).

♂ Adult. Much resembling the preceding, but with the chin, cheeks, throat and breast bright scarlet, which also is the color of the upper tail coverts. All other parts of the plumage black, generally tinged with brown on the abdomen. Bill shining metallic blue, both mandibles edged and tipped with red. ♀ Adult. Upper parts dark brownish ashy, upper tail coverts scarlet, throat, cheeks, (enclosing the eyes) breast and sides bright scarlet, abdomen brownish black, with numerous circular spots of white. ♂ Young.

148. PYRENESTES COCCINEUS, Cassin.
Pyrenestes coccineus, Cassin, Proc. Acad. Philada. 1848, p. 67.
Jour. Acad. Philada. i. pl. 30, fig. 2.
Specimens generally in young plumage. There are also in the present collection two specimens evidently in quite immature plumage, which have the bills so much weaker that I suspect they belong to a different species.
From the Camma and formerly from the Moonda.

149. ESTRELDA RUBRIVENTRIS, (Vieillot).
Fringilla rubriventris, Vieill.
Estrelda occidentalis, Jardine and Frazer, Cont. Orn. 1851, p. 156?
Vieill. Ois. Chant. pl. 13.
Several specimens in adult plumage from the Camma and Ogobai.

150. ESTRELDA MELPODA, (Vieillot).
Fringilla melpoda, Vieill.
Vieill. Ois. Chant. pl. 7.
Numerous specimens from the Camma, and formerly from Cape Lopez.

151. ESTRELDA ATRICAPILLA, J. & E. Verreaux.
Estrelda atricapilla, Verr. Rev. et Mag. Zool. 1851, p. 421.
From the Camma, and formerly from the Muni and Moonda.

152. SPERMESTES POENSIS, (Fraser).
Amadina poensis, Fraser, Proc. Zool. Soc. London, 1842, p. 145.
Fraser, Zool. Typ. pl. 50, fig. 1.
Frequently received in Mr. Duchaillu's collections. From the Camma, and formerly from the Moonda.

153. SPERMESTES CUCULLATA, Swainson.
Spermestes cucullata, Sw. B. of W. Afr., i. p. 201.
Von Müller, Beitr. Orn. Afr. pl. 16.
Numerous specimens from the Ogobai and Rembo, and formerly from the Moonda and Cape Lopez.

154. ORTYGOSPIZA ATRICOLLIS, (Vieillot).
Fringilla atricollis, Vieill.
Fringilla polyzona, Temm. Pl. Col. 221, fig. 3?
Specimens from the Camma, like others formerly received from Cape Lopez, have no trace of white on the throat nor around the eyes, though in all respects they agree precisely with Vieillot's description cited above. In seven specimens in the Acad Coll. labelled "*F. polyzona*, Temm. Gambia," the white markings are invariably present as represented in Temm. Pl. Col. 221, fig. 3.

155. FRINGILLARIA TAHAPISI, (Smith).
"Emberiza tahapisi, A. Smith." Mr. Verreaux's label.

Entire plumage dull brownish black except the upper tail coverts which are brick red, and a few feathers on the throat and breast which are scarlet.
Total length about 5½ inches, wing 2¾, tail 2¼ inches. Female rather smaller.
Hab.—Equatorial Africa. Rivers Moonda and Camma. (Mr. Duchaillu).
The adult males of these two species are easily distinguished by the chin, cheeks, and upper tail coverts being black in the first, and scarlet in the second species, though they are very similar in size and general appearance. The young males also are much alike, but that of *S. guttata* may always be recognized by the upper tail coverts being dull red. The females are more difficult to distinguish, both having the upper tail coverts scarlet or red in all ages. In the female of *S. hæmatina*, the red color of the cheeks frequently extends over the frontal feathers, completely inclosing the base of the bill, which characters I have never seen in that of *S. guttata*.

Specimens from the Camma, and formerly from Cape Lopez.

156. PASSER SWAINSONII, (Rüppell).
Pyrgita Swainsonii, Rüpp. Faun. Abyss.
Pyrgita simplex, Sw. B. of W. Afr. i. p. 208.
Rüpp. Faun. Abyss. pl. 33, fig. 2.

157. CORYTHAIX MERIANI, Rüppell.
Corythaix Meriani, Rüpp. Wiegm. Arch. xvii., p. 319.
Corythaix Verreauxii, Schlegel, Cab. Jour.
"Corythaix persa." Cassin, Cat. of B. from Cape Lopez.
Specimens from the Camma and Ogobai and formerly in all of Mr. Duchaillu's collections. Appears to be a common bird in Equatorial Africa.

158. TURACUS GIGANTEUS, (Vieillot.)
Musophaga gigantea, Vieill.
Corythaix gigas, Stephens.
Crax cyanea, J. E. Gray.
Le Vaill. Prom. pl. 19.
Specimens from the Camma and formerly from the Moonda. ♂ young. Head without a crest, throat naked, bill dull black, colors generally as in adult but duller, top of head black.

159. BUCEROS ATRATUS, Temminck.
Buceros atratus, Temm. Pl. Col. ii., (liv. 94.)
Buceros poensis, Fraser, Ann. and Mag. Nat. Hist., 1855, p. 136.
Temm. Pl. Col. 558.
Both sexes from the Ogobai.

160. BUCEROS CYLINDRICUS, Temminck.
Buceros cylindricus, Temm. Pl. Col.
Temm. Pl. Col. 521.
A single specimen of the male in adult plumage from the Camma.

161. BUCEROS FISTULATOR, Cassin.
Buceros fistulator, Cassin, Proc. Acad. Philada. 1850, p. 68.
"Buceros leucostigma, Temm. Mus. Lugd." Hartl. Orn. W. Afr. p. 162.
The young male or the female is described by me as above, and only in the present collection have I ever seen the adult. It is larger than the dimensions given in the description above referred to, but smaller than *B. buccinator*, Temminck, which it resembles, though quite distinct.
♂ Adult. Two middle feathers of the tail, black, all the others white. Head crested, the feathers of which are wide and rounded at the end. Head, breast, sides and upper parts of body black, with a greenish lustre, rump, upper and under tail coverts and abdomen, white. Primary quills black, secondaries entirely white, tertiaries black tipped with white, under wing coverts white. Bill with its upper segment distinct but small, under mandible rugose, (bill pale yellow in dried skin, under mandible with a large space in the middle brownish black.)
Total length about 21½ inches, wing 9¾, tail 8, bill 4, lateral width of bill 2 inches.
Hab.—Rivers Camma, Muni and St. Paul's, Western Africa. Mus. Acad. Philada.

162. BERENICORNIS ALBOCRISTATUS, (Cassin.)
Buceros albocristatus, Cassin, Proc. Acad. Philada.
"Buceros macrourus, Temm. Mus. Lugd." Hartl. B. of W. Afr., p. 163.
Jour. Acad. Philada. i. pl. 15.
Numerous specimens from the Camma and formerly from the Muni and Moonda. The description and figure as above is of the adult. In the younger bird the cheeks are frequently black, and the quills and wing coverts widely tipped with white.

163 TOCKUS FASCIATUS, (Shaw.)
Buceros fasciatus, Shaw.
Le Vaill. B. of Afr., pl. 233.
From the Camma and Ogobai and formerly from the Moonda and Cape Lopez Apparently the most abundant bird of this family in Equatorial Africa.

164. TOCKUS CAMURUS, Cassin.
Tockus camurus, Cassin, Proc. Acad. Philada. 1856, p. 319.
Several specimens from the Camma not different in any considerable degree from those formerly received from Cape Lopez. This is the smallest species of the group of *Buceros*.

165. PSITTACUS PACHYRHYNCHUS, Hartlaub.
Psittacus pachyrhynchus, Hartl. Verz. Mus. Brem. p. 88.
Psittacus magnirostris, Bonap. Consp. i. p. 5.
Psittacus Le Vaillantii, Lath. Ind. Orn. Supp. p. 23?
Several specimens in adult plumage from the Camma and also from the Mnni.

166. POGONIAS HIRSUTUS, Swainson.
Pogonias hirsutus, Swains. Zool. Ill. ii. pl. 72.
Specimens from the Camma and Ogobai and formerly from the Moonda.

167. BARBATULA DUCHAILLUI, Cassin.
Barbatula Duchaillui, Cassin, Proc. Acad. Philada. 1855, p. 324, (April.)
Buccanodon formosus, Verreaux, Rev. et Mag. Zool. 1855, p. 218, (May.)
Rev. et Mag. Zool. 1855, pl. 5.
Specimens from the Camma.

168. BARBATULA SUBSULFUREA, (Fraser.)
Bucco subsulfureus, Fraser, Proc. Zool. Soc. London, 1843, p. 3.
Fraser, Zool. Typ. pl. 52.
From the Ogobai and formerly from the Moonda.

169. BARBATULA SCOLOPACEA, (Bonaparte.)
Xylobucco scolopacea, Bonap. Consp. Av. i. p. 141.
"Bucco scolopaceus, Temm. Mus. Lugd." Bonap. as above.
Barbatula stellata, Fraser, Proc. Zool. Soc. London, 1843, p. 4?
Numerous specimens which appear to be this species, but apparently not mature. From the Camma and Moonda.

170. GYMNOBUCCO CALVUS, (Lafresnaye.)
Bucco calvus, Lafres. Rev. Zool.. 1841, p. 241.
A specimen in the present collection seems to be this species, though the dimensions are rather larger than as given in the description above cited.
From the Ogobai.

171. GYMNOBUCCO FULIGINOSA (Cassin.)
Barbatula fuliginosa, Cassin, Proc. Acad. Philada., 1855, p. 324.
Gymnobucco Bonapartei, Verreaux, Cab. Jour., 1855, p. 102?
Numerous specimens have now been received from Mr. Duchaillu, not one of which has the head above or any portion of it naked, nor are they in several other respects as described by Mr. Verreaux as above. My present opinion is that ornithologists are in error in regarding the two names above cited as synonymous. Sexes alike, and presenting no other characters than as given by me in the description referred to above.
From the Camma and Ogobai and formerly from the Moonda.
A fine specimen of *Gymnobucco Peli*, Hartlaub, is in the Acad. Coll., having been received from the Leyden Museum through the kindness of the late illustrious naturalist, Temminck. It is specifically quite distinct from either of the species here given, though the investigation of the birds of this curious genus is not without difficulties.

[April,

172. TRACHYPHONUS PURPURATUS, Verreaux.
Trachyphonus purpuratus, J. & E. Verreaux, Rev. et Mag. Zool. 1851, p. 260.
Apparently not rare in Equatorial Africa. From the Camma and formerly from the Moonda.

173. DENDROPICUS GABONENSIS, (J. & E. Verreaux.)
Dendrobates gabonensis, Verr. Rev. et Mag. Zool. 1851, p. 513.
Numerous specimens from the Camma, nearly all of which, however, appear to be immature.

174. DENDROPICUS NIGRIGUTTATUS, (Verreaux.)
Dendromus nigriguttatus, Verreaux.
From the Camma and Ogobai, and formerly from the Moonda.

175. DENDROMUS CAROLI, (Malherbe.)
Chloropicus Caroli, Malh. Rev. et Mag. Zool. 1852, p. 550.
Appears to be the most abundant woodpecker in Equatorial Western Africa. From the Camma and formerly from the Moonda and Cape Lopez.

176. DENDROMUS BRACHYRHYNCHUS, Swainson.
Dendromus brachyrhynchus, Swains. B. of W. Afr. ii. p. 160.
"Picus chloronotus, Cuvier," Pucheran, Rev. et Mag. Zool. 1852, p. 479.
Several specimens which appear to be this species, from the Camma.

177. DENDROMUS NIVOSUS, Swainson.
Dendromus nivosus, Swains. B. of W. Afr. ii. p. 162.
Specimens from the Camma and Ogobai.

178. DENDROMUS AFRICANUS, (Gray) ?
Picus africanus, Gray, Zool. Misc., p. 18, (1831) ?
Both sexes of a species much resembling that described as above, but, unfortunately, not in mature plumage. This bird belongs to the same group as *Picus namaquus*, Lichtenstein, Le Vaill. Ois. d'Afr. vi., pl. 251, 252, (which is the same as *P. mystaceus*, Vieill. and *P. biarmicus*, Cuvier,) and *Dendrobates schoensis*, Rüppell, Syst. Ueber, pl. 33.
It is very probably the species described by Gray, as above, but I prefer inserting it doubtfully, hoping to receive mature specimens. From the Camma, and formerly from Cape Lopez.

179. DENDROMUS.
In addition to the preceding species of Woodpeckers, there are several others in Mr. Duchaillu's collections, and especially in the present, from the Camma, which are at least not easily referable to known species. In fact, though with a large majority of known African species before me, in the Acad. Coll., the investigation of the Woodpeckers alone in this collection has required so much time, that I am under the necessity of abandoning it, without satisfactory conclusions, so far as relates to several species.*

*The following species of *Picidæ*, from Western Africa, are in the Academy collection:
1. Dendropicus minutus, (Temminck).
2. Dendropicus obsoletus, (Wagler).
3. Dendropicus gabonensis, (Verreaux).
4. Dendropicus goertan, (Gmelin).
5. Dendropicus poliocephalus, (Swainson).
6. Dendropicus immaculatus, (Swainson).
7. Dendropicus pyrrhogaster, (Malherbe).
8. Dendromus punctiligerus, (Wagler).
9. Dendromus chrysurus, Swainson.
10. Dendromus brachyrhynchus, Swainson.

180. INDICATOR MACULATUS, G. R. Gray.
Indicator maculatus, G. R. Gray, Gen. of B. ii., pl. 113.
Two specimens from the Ogobai, labelled as male and female, are precisely as given by Mr. Gray in his excellent figure above cited, and are the first that have ever come under my notice. This bird is certainly not the young of *I. major*, to which authors seem inclined to assign it, though that species is also spotted on the under parts in young plumage.

181. MELIGNOTHES EXILIS, Cassin.
Melignothes exilis, Cassin, Proc. Acad., Philada., 1856, p, 157.
Two other specimens in adult plumage, and corresponding in all respects with that described by me, as above. From the Camma.

182. HETÆRODES INSIGNIS, Cassin.
Hetærodes insignis, Cassin, Proc. Acad., hilada., 1856, p. 157.
One specimen only quite similar to that from the Moonda, described as above cited. From the Camma.

183. CENTROPUS FRANCISCI, Bonaparte?
Centropus Francisci, Bonap. Consp. Av. i. p. 107?
A large species, the specimens of which are probably not in mature plumage, but much like the descriptions cited above and given by Dr. Hartlaub. From the Camma.

184. CENTROPUS MONACHUS, Rüppell.
Centropus monachus, Rüpp. Neüe Wirb. Birds, p. 57, pl. 21, fig. 2.
Specimens in mature plumage quite identical with others from North Eastern Africa, in the Academy collection. From the Camma.

185. ZANCLOSTOMUS AEREUS, (Vieillot).
Cuculus aereus, Vieill. Ency. Meth., p. 183.
Zanclostomus flavirostris, Swains. B. of W. Afr. 12, p. 183.
Le Vaill. Ois. d'Afr., pl. 215, Swains. B. of W. Afr. ii. pl. 19,
Evidently an abundant species. From the Ogobai and Rembo, and formerly from the Moonda.

186. CUCULUS GABONENSIS, Lafresnaye.
Cuculus gabonensis, Lafres. Rev. et Mag. Zool., 1853, p. 60.
Two species in mature plumage from the Camma.

187. CHRYSOCOCCYX SMARAGDINEUS, (Swainson).
Chalcites smaragdineus, Swains. B. of W. Afr. ii. p. 191.
In young plumage, and the only specimen of any species of this genus received from Mr. Duchaillu. From the Camma.

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11. Dendromus nigriguttatus, Verreaux.
12. Dendromus Caroli, (Malherbe).
13. Dendromus nivosus, Swainson.
14. Dendromus africanus, (Gray)?

In addition to which, are several undetermined species, and numerous specimens of a little species in the Rivoli collection, labelled "*Picus senegalensis*," with the locality occasionally added, "Senegal." The latter appears to be the species described by Gmelin under this name, and figured by Buffon, Pl. Enl. 345, fig. 2, but may not be an African bird. It apparently belongs to the same generic group as species labelled "*P. affinis*," "*Mesopicus Cecilii*," and others in the Academy collection.

Properly, these birds belong to various groups or genera, and several of them have strongly allied forms in Eastern Africa, and the same latitudes in Asiatic Islands.

188. TRERON NUDIROSTRIS, (Swainson).
Vinago nudirostris, Swains. B. of W: Afr. ii. p. 205.
Bonap. Hist. Nat. Pigeons, pl. 3.
Received in all of Mr. Duchaillu's collections. From the Camma and Ogobai.

189. COLUMBA MALHERBEI, Verreaux.
Columba Malherbii, Verr. Rev. et Mag. Zool., 1851, p. 514.
"Columba chalcauchenia, Gray," Hartl. Orn. W. Afr., p. 194.
Both sexes in mature plumage from the Camma.

190. COLUMBA IRIDITORQUES, Cassin.
Columba iriditorques, Cassin, Proc. Acad. Philada., 1856, p. 157.
Numerous specimens from the Camma. Sexes alike.

191. COLUMBA UNICINCTA, nobis.
♂ Head above and neck light cinereous, back and upper wing coverts dark lead color, every feather edged with light bluish cinereous, giving a squamose or scale-like character to those parts; rump and upper tail coverts dark lead color more obscurely edged with bluish ashy. Upper parts pale vinaceous, nearly white on the throat and pale ashy on the sides and flanks, middle of abdomen, tibiæ, and under tail coverts white. Quills ashy black, narrowly edged externally with white; tail dark lead color, nearly black, with one wide transverse band of white across the middle of all the feathers. Under wing coverts dark cinereous. Bill dark greenish at base; tip of both mandibles yellow; feet black or horn color. A large, naked space around the eye red or dark yellow.
Total length about 13 inches, wing 8, tail 5 inches.
Hab.—River Ogobai, Western Africa. Discovered by Mr. P. B. Duchaillu.
A single specimen labelled as a male of this species is in the collection from the Ogobai, and I have failed to identify it with any species or description which has come under my notice; nor does it resemble any other species known to me in such degree as to render it necessary to point out comparative distinctions. It seems to belong to the group *Palumbus*, though it appears to me to approach *Carpophaga* more nearly than any species that I have yet seen from Africa, and its general appearance is somewhat like that of the plainer species of that group (*C. cineracea*, *rosacea* and others). It is entirely without any white or black collar, or other markings on the neck, and the present specimen has no metallic tint whatever on any part, though having all the characters of an adult bird.
Though of very plain colors, this is a large and handsome species, and I regard it as one of the most interesting birds in the present collection. A single specimen only is from the River Ogobai.

192. TURTUR ERYTHROPHRYS, Swainson.
Turtur erythrophrys, Swains. B. of W. Afr. ii. p. 207, pl. 22.
Numerous specimens from the Camma, and formerly from the Moonda.

193. PERISTERA TYMPANISTRIA, (Temminck).
Columba tympanistria, Temm. Pig., pl. 36.
Le Vaill. Ois. d'Afr. vii., pl. 272.
Specimens from the Camma, and formerly from the Muni.

194. PERISTERA PUELLA, Schlegel.
Peristera puella, Schleg. Beydr. Dierk, i. p. 19, pl. 6.
Specimens of this beautiul species are from the Camma and Ogobai, and formerly from the Muni. The adult male is represented in the very handsome figure cited above, but the sexes are not to be distinguished, except by the rather smaller size and duller colors of the female.

195. PERISTERA AFRA, (Linnæus).

Columba afra, Linn. Syst. Nat. i. p. 284, (1766).

Rüpp. Syst. Uebers., pl. 38, Buff. Pl. Enl. 160.

Apparently an abundant species on the Camma and Ogobai, and formerly received in Mr. Duchaillu's collections, from the Moonda and Muni. This seems to be the species figured by Rüppell, as above and described by that author and others, as *C. chalcospilos*.

196. PERISTERA CHALCOSPILOS, (Wagler).

Columba chalcospilos, Wagler, Syst. Av. sp. 83, (1827).

Le Vaill Ois. d'Afr. vii., pl. 271.

Two species very nearly allied have been received in Mr. Duchaillu's collection from the Camma. The present bird has the spots on the quills constantly lustrous metallic green, not purple, as in the preceding. It appears to be the species indicated by the Prince Bonaparte, under the name here adopted in Conspectus Avium ii. p. 68, though not agreeing with his description in all particulars.

[To be continued.]

Notes on a Collection of Japanese Fishes, made by Dr. J. Morrow.

BY THEO. GILL.

The collection of Japanese fishes, which it is now proposed to notice, has been submitted to us by Prof. Baird, of the Smithsonian Institution, and was formed during the expedition to Japan, under the command of Commodore Perry. It contains specimens of eighteen species, six of which are believed to be new. All the remaining, with exception of two species, (*Gasterotokeus biaculeatus* of Heckel and *Amphiprion frenatus*, Brevoort,) have been previously described as inhabitants of Japan, by Temminck and Schlegel, in the Ichthyological portion of the Fauna Japonica.

ACANTHOPTERYGII Cuv.

SCORPÆNOIDÆ Sw., Girard.

APISTINÆ Gill.

1. Gymnapistes rubripinnis.

Apistus rubripinnis Tem. and Schl. Fauna Japonica, Pisces, p. 49, pl. xxii. fig. 2.

Apistus rubripinnis Brevoort, Notes on figures of Japanese Fish, p. 10, ib. in Narrative Expedition to Japan, vol. 2, p. 262, pl. vi. fig. 5.

This fish belongs to Swainson's genus Gymnapistes, established for those species of the Apistus of Cuvier which are destitute of scales, and all of whose pectoral rays on each side are connected by the membrane and form a single entire fin.

Swainson has entirely perverted the name of Apistus, or Apistes as it is spelled by him, by applying it to Cuvier's genus Minous, which latter name he has probably abolished on account of its barbarous origin. As the barbarity of a name is not sufficient to authorize such an act, Minous must be restored to the genus for which it was first used, and Apistus may be retained for the first Cuvieran section of the group embraced under that name.

MONOCENTROIDÆ Gill.

The peculiar and cavernous nature of the bones of the head and the large osseous shields of the body appear to detach the genus Monocentris from the other families of the Cataphracti.

MONOCENTRINÆ Gill.

2. Monocentris Japonicus.

Monocentris Japonicus Brevoort, Notes on Figures of Jap. Fish, p. 10; ib. in Narrative Expedition to Japan, vol. 2, p. 262, pl. vi. fig. 6.

A single specimen of this fish is in the collection of Dr. Morrow. The figure accompanying the above cited memoir of Mr. Brevoort is a very accurate representation of its form. In spirits, the plates are of a brown brass color, and the interspaces are blackish. The specimen is of the size figured in the plate. Is there more than one species of the genus? or does the young differ in form from the adult?

SCOMBROIDÆ Cuv.

TRICHIURINÆ Bon.

3. Trichiurus Japonicus.

Trichiurus Japonicus Blkr. Verhand. von Batav. Genootschop, vol. 26, Nieuwe Nalez, Ich. Jap., p. 98. 1857.

This species has been fully described by Dr. Bleeker in his recent Memoir on the Fishes of Japan and their geographical distribution. One specimen was obtained by Dr. Morrow.

ECHENEIDOIDÆ Bon.

ECHENEIDINÆ Bon.

4. Echeneis naucrates.

A single specimen of the species identified by Temminck and Schlegel with the Linnæan Echeneis naucrates was obtained by Dr. Morrow. It has twenty-four plates in its disc, and the sides of the caudal fin are posteriorly bordered with white.

GOBIOIDÆ Cuv.

GOBINÆ Bon., Gill.

5. Acanthogobius flavimanus.

Gobius flavimanus Tem. and Schl. Fauna Japonica, Pisces, p. 141, pl. lxxiv. fig. 1.

An individual of this species, five inches in length, was obtained by Dr. Morrow.

6. Rhinogobius similis Gill.—This fish has a great superficial resemblance to Acanthogobius flavimanus, but differs generically in the naked sides of the head and in the normal number of dorsal spines.

The head is as elongated as that of A. flavimanus, but is more gibbous between the eyes and jaws; it forms nearly a quarter of the entire length, inclusive of the caudal. The eyes are moderately large, and are placed midway between the snout and operculum. There are about twenty-eight scales in a lateral row on the side.

$$D\ \text{vi},\ 1,\ \tfrac{1}{1}\ -\ A\ 1,\ \tfrac{7}{1}\ -\ C\ 9,\ 7,\ 7,\ 9,\ P\ 18,\ V,\ 1,\ 5+5,\ 1.$$

The color is tawny, punctured with black above, and darker on the profile and operculum, and there is on each side a row of five large dark spots. The second dorsal is irregularly clouded; the other fins are immaculate.

This species would answer quite well to the description of Gobius Pflaumii of Bleeker, were it not for the elongated form of the head. It agrees with that species in the clear fins and in the number of scales on the sides.

The genera to which the two Gobinæ of this catalogue are referred, are fully described in a Memoir on the Gobinæ of the North Pacific Expedition, communicated to the Lyceum of Natural History of New York.

1859.]

LUCIOGOBIUS Gill.

Body naked, elongated and slender, with the height nearly uniform to the caudal fin, anteriorly cylindrical; head depressed, above elongated oval, swollen on the sides, and with a central linear depression; eyes widely separated, entirely in the anterior half of the head, small and covered by the skin; mouth nearly horizontal, moderately large and extending under the eyes; teeth pluriserial on the jaw, largest in the external row, not passing to the corner of the mouth; vomer and palatine toothless; tongue large, free and deeply emarginated anteriorly; branchial apertures small, nearly vertical and anterior to the bases of the pectorals; branchiostegals four on each side; dorsal fin nearer the caudal than the head, single and oblong, preceded by one or two simple inarticulated rays; anal opposite the dorsal; caudal rounded; pectorals rounded, with the rays entirely connected by the membrane and with vertical bases; ventrals small, united in a simple infundibuliform basin, and each composed of a spine and five-branched rays; interspinal membrane low; lateral line obsolete.

This is the type of a very distinct tribe of the Gobioids, well characterized by the esociform position of the dorsal and anal fins, and by the very small number of simple rays. In the latter respect, they are represented in the other families of Acanthopterygians by Ophicephalus, Bl., Aphredoderus, Les., Ichthyoscopus, Sw., Aspidophoroides, Lac., Pseudochromis, Rup., &c.

In the form of the head it has a slight resemblance to *Trichænophorus*, Gill.

7. L. guttatus Gill.—The body is much elongated and imperceptibly declines to the caudal fin. The height at the pectorals is between a twelfth and thirteenth of the extreme length, and near the caudal, it is rather more than a seventeenth of the same length.

The head is oblong oval above; it forms about two-ninths of the total length; its breadth equals five-ninths of the length, and is twice as great as the height.

The dorsal is situated slightly anteriorly to the sixth-tenth of the extreme length; it is oblong and sustained by two inarticulate and twelve branched rays. The anal is under the dorsal, and has thirteen rays, the first of which is small and inarticulate.

The body is brown, thickly punctured with black; the caudal, dorsal and pectoral fins are also dotted with black.

A single specimen of the length of two inches and a half is in the collection

BLENNOIDÆ Raf.

CENTRONOTINÆ Gill.

8. Centronotus subfrenatus Gill.—This species differs from the previously known Japanese species of the genus C. crassispinnis, (*Gunnellus crassispinnis* Temm. and Schlegel, Fauna Japonica, Pisces, p. 139,) C. nebulosus (*Gunnellus nebulosus*, T. S. l. c.,) and C. dolichogaster (*Gunnellus dolichogaster*, Brevoort,) by the presence of an almost vertical band, margined on each side by purplish-white, which passes from the lower border of the eye to the margin of the preopercle behind the lower jaw. A widely curved band of purplish-white with a row of black dots passes from eye to eye; the convexity of the curve is posterior. The body is reddish-brown with a dorsal band of black, and with a lateral row of large confluent black spots. The fins are immaculate, but the posterior margin of the caudal is white. The dorsal has from seventy-six to seventy-nine spines.

Several specimens of this species were obtained by Dr. Morrow, but only one of them is in a good state of preservation.

As the name of Centronotus was given to the Cuvieran Gunnelli before its application to a Scombroid genus by Lacepede, and subsequently by Mitchell, there is no reason why it should not be retained for the present genus.

Schneider has well restricted it in the Systema Ichthyologiæ of Bloch,* assigning to it the same essential characters as Cuvier himself.

AULOSTOMATOIDÆ Raf. 1810.

FISTULARIANÆ Bon.

9. Fistularia immaculata Comm.
Two small specimens of this species were obtained at Simoda.

PSEUDOCHROMIDOIDÆ Mull.

PSEUDOCHROMIDINÆ Gill.

10. Cichlops Japonicus Gill.—This species scarcely differs in general form from its congeners, and is very nearly allied to the C. cyclophthalmus of Muller and Troschel. It is chiefly distinguished from that species by the position of the bases of the ventrals, under the lower angles of those of the pectorals. The color is tawny, much darker in the centres of the scales on the back and on the sides above the pectorals. The posterior border of the orbit is margined by a black crescent. The dorsal has a few minute black dots. The membranous margin of the preopercle presents the appearance of being sustained by rays. There are about fifty-two scales in a longitudinal row along the sides.

D ii. 25, A iii. 14, C 6, 9, 8, 5, P 19, V i. 5.

The single specimen in the collection has a length of little more than four inches.

(PHARYNGOGNATHI Mull.)

POMACENTROIDÆ Bon.

POMACENTRINÆ Bon.

11. Pomacentrus dorsalis Gill.—The body is oblong oval, with its abdominal outline more arched than its dorsal. The head is small, and its outline from the nape to the snout is straight. The eye is large and near the profile. The suborbital has a simple, strong tooth directed horizontally backwards, and separated by a semi-elliptical sinus from the body of the bone. The suborbital beneath the eye has also one or two small vertical processes. There are about twenty-five scales in a longitudinal row on the side.

D xiii. 15, A ii. 15, C 3, 9, 8, 3, or 5, 1, 5, 6, 1, 5, P 18, V i. 5.

The color is brown, with one or two obscure bluish dots on each posterior scale of the sides. The operculum and preoperculum have a few more distinct ones, and there is also a distinct black dot at the scapular angle of the operculum. A large black spot, bordered anteriorly by bluish white, is on the posterior rays of the dorsal. There is a black dot at the upper angle of the base of the pectoral. The ventrals are purple; the caudal yellow towards the base.

One specimen is in the collection; its length is nearly three and a half inches.

12. Glyphidodon cœlestinus.—This species does not appear to have been previously found at Japan. Two specimens are in the collection of Dr. Morrow.

The G. smaragdinus Brevoort† appears to be quite distinct from this species, if the figure given in the Notes on Japanese Fish is correctly drawn. It is much

*Corpus gracile, pinna dorsi longitudinalis, tota aculeata: Syst. Ich., Schneid., p. 165, 1801.

†Notes on some figures of Japanese Fish, p. 12, pl. vi. fig. 3; ibid. in Narrative Expedition to Japan, vol. 2, p. 264, pl. vi. fig. 3.

higher than G. cœlestinus, the bands are not as distinct, and the first and last ones of G. cœlestinus are obsolete; it is still more distinguished by the absence of the longitudinal submarginal black bands of the caudal, so distinct in G. cœlestinus. The number of dorsal spines appears to be the same in both species.

AMPHIPRIONINÆ Gill.

13. Amphiprion frenatus Brev.—Notes on figures of Japanese Fish, p. 11, ib. in Narrative Expedition to Japan, vol. 2, p. 263, pl. vi. fig. 4. 1856.

The color of this species, as preserved in alcohol, is very different from that of the living fish. The ground color is tawny. The oblique band behind the eye is purplish white, bordered on each side by black. There are nine spinous rays in the dorsal fin. The groups of radiating opercular ridges terminating in spines, and which are characteristic of the *Amphiprioninæ*, are perfectly distinct, although they are not shown in the above quoted figure.

Two specimens of the species were collected by Dr. Morrow.

LABROIDÆ Cuv.

LABRINÆ Bon.

14. Julis cupido Tem. and Schl.—One specimen is in the collection formed by Dr. Morrow.

15. Halichœres pyrrhogramma.

Julis pyrrhogramma Tem. and Schl., Fauna Japonica, Pisces, p. 170; pl. lxxxvi. fig. 2.

A single specimen is in the collection.

SYNENTOGNATHI Gill.

The abdominal Malacopterygian Pharyngognaths of Dr. Müller do not appear to belong to the same natural order as the Pomacentroids and allied fishes. If the coalescence or separation of the inferior pharyngeal bones is to be esteemed as of ordinal value, the two sections that have been confounded under the name of Pharyngognathi should be at least separated, and regarded as distinct orders. In such a case, the above name may be used to embrace the Exocœti, Scomberesoces, &c. There is so striking a parallelism between the genera of Acanthopterygian Pharyngognaths and the true Acanthopterygians, that a doubt may be even entertained whether the pharyngeals are of really ordinal value in classification. Certain it is, that no less than three genera that actually belong to the Pharyngognathi of Müller, were confounded by Cuvier himself with genera of the Mullerian Acanthopteri, Pterophyllum of Heckel being referred to Platax, Astronotus of Swainson to Lobotes and Amblodon of Rafinesque to Corvina. The connection of those respective genera appears, however, to be one of analogy rather than of affinity.

SCOMBERESOCES Mull.

HEMIRHAMPHINÆ Gill.

16. Hemirhamphus occipitalis Gill.—The height is scarcely contained twelve times in the length from the *upper jaw* to the end of the caudal fin. The head forms nearly a fifth of the same length, and its height is contained between two and two and a half times in its length. The eyes are large, the diameter of an orbit exceeding a fourth of the length of the head, and equalling the interorbital space. The upper jaw is triangular, longer than wide, and acutely rounded; the distance from the middle of its side to the orbit equals an orbit's diameter. The lower jaw, from the corner of the mouth to the tip, is more than a half greater than the length of the head, and forms a fourth of the *extreme* length. The dorsal fin commences between the sixth and seventh of

the length from the upper jaw to the end of the caudal, and is entirely over the anal. The pectorals, when bent forwards, reach at least to the centre of the pupil.

D 13, A 14, &c.

The general color is chocolate brown, with the usual lateral silver band broader between the dorsal and anal. A number of small purplish dots, and a few larger ones, form a triangular area on the occipital region, the apex of which is posterior, and the base emarginated; and from the angles of the base, two bands of spots proceed, and converge anteriorly. Above the orbit there is also a pale bluish area dotted with black.

A single specimen of this species, little more than four inches in length, is in the same collection. The color is much changed, or, at least, is quite distinct from that of most other species of the genus, but resembles more that of *Hemirhamphus Gernærti* of Valenciennes.

It does not agree with the description of any of the known species of the genus. The H. Gernærti Val. appears to be its nearest ally, but the beak of that species is said to be the fifth of the total length, and no mention is made of any peculiarity in the coloration of the head. The H. intermedius of Cantor and Richardson differs in the number of rays, in color and in proportions. H. Sajori of Temminck and Schlegel is distinguished by its short beak. In H. japonicus of Brevoort, the anal appears to commence nearly under the middle of the dorsal, and the beak is also shorter. The present appears, therefore, to be undescribed.

LOPHOBRANCHII Cuv.

SYNGNATHOIDÆ Bon.

SOLEGNATHINÆ Gill.

17. Gasterotokeus biaculeatus Heckel.—This species, although widely distributed in the Eastern seas, and common on the Chinese coasts, has not been previously noticed as an inhabitant of Japan. Two specimens were obtained there by Dr. Morrow.

SYNGNATHINÆ Bon.

18. Syngnathus Schlegeli Kaup.

Sygnathus tenuirostris, Tem. and Schl. Fauna Japonica, Pisces, p. 273, pl. cxx. fig. 6, (non Rathke).

Sygnathus Schlegeli Kaup, catalogue Lophobranchii in British Museum, p. 46.

Two specimens of this species are also in the collection of Dr. Morrow.

The paper entitled "Observations upon the relations existing between Food, and the capabilities of men to resist low Temperatures, by I. I. Hayes, M. D.," was, on report of the Committee of the Biological Department, to which it had been referred, recommended to be published in a Medical Journal.

The following resolutions, presented by the Committee on Proceedings, were adopted:

Resolved, That the subscription to the Proceedings after the present year be increased to two dollars.

Resolved, That the Committee appointed to examine papers offered for publication in the Proceedings, be instructed, when it may be deemed expedient, to confer with the Committee on Proceedings, with a view to procure greater condensation of the material to be printed.

In accordance with the first of these resolutions, the recommendation of the Committee on Publication fund, fixing the price of commutation

of subscription to the Proceedings at twenty-five dollars was concurred in.

The following was adopted:

Resolved, That the price of the volumes of Proceedings for 1857 and '58, already completed, and that for 1859 when completed, be uniform with that of the previously published volumes, (two dollars.)

May 3d.

Mr. LEA, President, in the Chair.

Thirty-eight members present.

Dr. Leidy called attention to a fragment of jaw of Mososaurus presented this evening, in which the tooth of succession was preserved in the cavity beneath the worn projecting tooth.

Dr. Carson exhibited some Chinese chemicals, and remarked specially upon a calomel in crystalline scales resembling boracic acid, which was formed by the empirical process of subliming a mixture of alum, common salt and mercury. It is quite free from corrosive sublimate.

May 10th.

Mr. LEA, President, in the Chair.

Forty-nine members present.

The following papers were presented for publication in the Proceedings:

Description of a third genus of Hemiramphinæ, by Theodore Gill.

Description of seven new species of Uniones, &c., by Isaac Lea.

And were referred to Committees.

Dr. R. E. Rogers, by request of the Academy, gave a lecture on the correlation of forces, illustrated with numerous experiments, showing the mutual convertiblity of different kinds of force.

The number of the Proceedings of the Academy for April was laid on the table.

May 17th.

Mr. LEA, President, in the Chair.

Forty-nine members present.

Dr. Leidy called attention to specimens of Palæotrochus presented this evening by Prof. E. Emmons, from subsilurian strata: he stated that its organic nature had been denied by able authorities, but considered that its symmetry and uniformity were in favor of its being a fossil; it had most strongly the appearance of a coral.

Dr. Le Conte had seen a similar body of larger size from the copper-bearing rocks of Point Keewenaw, Lake Superior. He could not conceive that such numbers of masses of similar form could arise from molecular action forming concretions.

Prof. Emmons exhibited a drawing of a fossil head, supposed to belong to Clepsysaurus, found in Chatham Co., North Carolina: it was covered with plates, some of which were exhibited, and had a very elongated slender snout, expanded at the tip, with the nostrils situated at the base.

May 24th.

Mr. LEA, President, in the Chair.

Seventy-seven members present.

A paper was presented for publication in the Proceedings, entitled Ichthyological Notices by Charles Girard, M. D.

And one for publication in the Journal, entitled New Unionidæ of the United States, by Isaac Lea.

Which were referred to Committees.

The death, at Berlin, of Baron Alexander von Humboldt, late a Correspondent of the Academy, was announced.

May 31st.

Vice-President BRIDGES in the Chair.

Fifty-one members present.

The Report of Proceedings of the Biological Department for the present month was read.

On report of committees of the Biological Department, the papers entitled, The Pathological Relations of Cancer, by J. H. Packard, M.D., and On two new varieties of Wourari, Carroval and Vao, by William A. Hammond, M. D., and S. Weir Mitchell, M. D., were recommended for publication in a medical journal.

On report of the respective Committees, the paper entitled, New Unionidæ, of the United States, by Isaac Lea, was ordered to be published in the Journal.

And the following in the Proceedings:

Descriptions of Twenty-one New Species of Exotic UNIONIDÆ.

BY ISAAC LEA.

UNIO SIKKIMENSIS.—Testâ lævi, obovatâ, inæquilaterali, subinflatâ, posticè obtusè biangulatâ; valvulis crassiusculis; natibus prominulis; epidermide luteo-fuscâ, eradiatâ; dentibus cardinalibus parvulis, brevibus crenulatis, in utroque valvulo duplicibus; lateralibus brevibus subcurvisque; margaritâ albâ et iridescente.

Hab.—Sikkim, India. H. Cuming and Prof. Hanley.

UNIO DIMINUTIS.—Testâ plicatâ, corrugatâ, subsulcatâ, ellipticâ, inæquilaterali, compressâ, posticè obtusè angulatâ; valvulis crassiusculis; natibus subprominentibus, ad apices undulatis acuminatisque; epidermide luteâ eradiatâque; dentibus cardinalibus parviusculis, compressis, erectis, crenulatis, in utroque valvulo duplicibus; lateralibus subbrevibus rectisque; margaritâ pallido-salmonitâ et iridescente.

Hab.—East Africa. H. Cuming and Prof. Hanley.

UNIO PLICATULUS.—Testâ minutè plicatâ, valdè oblongâ, compressâ, valdè inæquilaterali, posticè obtusè angulatâ; valvulis tenuibus; natibus prominulis; epidermide luteo-fuscâ, radiatâ; dentibus cardinalibus obliquis, lamellatis, longis, pertenuibus, dente cardinali valvulæ dextræ duplici; lateralibus longis, acicularis rectisque; margaritâ cæruleo-albâ et valdè iridescente.

Hab.—Borneo. H. Cuming.

UNIO NAVIGIOLIFORMIS.—Testâ minutè plicatâ, valdè oblongâ, subinflatâ, valdè inæquilaterali, posticè truncatâ et subemarginatâ, ad basim emarginatâ, anticè ovato-rotundatâ; valvulis crassiusculis; natibus prominulis; epidermide tenebroso-fuscâ, eradiatâ, micante; dentibus cardinalibus crassiusculis, obliquis, compressis, in utroque valvulo duplicibus; lateralibus prælongis subcurvisque: margaritâ albâ et iridescente.

Hab.— ——? H. Cuming.

UNIO FLUCTIGER.—Testâ perplicatâ, subtransversâ, compressâ, valdè inæquilaterali, posticè subrotundatâ, ad basim subemarginatâ; valvulis tenuibus; natibus parvis, prominulis; epidermide luteo-olivâ, transversè et minutè striatâ, eradiatâ; dentibus cardinalibus parvis, obliquis, compressis, in utroque valvulo duplicibus; lateralibus longis subrectisque; margaritâ cæruleo-albâ et iridescente.

Hab.— ——? H. Cuming.

UNIO MUTABILIS.—Testâ lævi, latè ellipticâ, subcompressâ, valdè inæquilaterali, ad basim subrectâ; valvulis tenuibus, anticè crassioribus; natibus prominulis, ad apices undulatis, ferè terminalibus; epidermide castaneâ, nitidâ et eradiatâ; dentibus cardinalibus parvis, in utroque valvulo duplicibus; lateralibus prælongis subcurvisque; margaritâ cæruleo-albâ et valdè iridescente.

Hab.—Brisbane Water, Australia; New Zealand, H. Cuming; and Murray River, Australia, W. Newcomb, M. D.

UNIO THWAITSII.—Testâ lævi, regulariter ellipticâ, subinflatâ, inæquilaterali; valvulis crassiusculis; natibus prominulis; epidermide castaneâ, politâ, transversè fasciatâ; dentibus cardinalibus valdè compressis, lamellatis, valdè obliquis, in utroque valvulo duplicibus; lateralibus longis, lamellatis curvisque; margaritâ salmonis colore tinctâ et iridescente.

Hab.—Ceylon. Mr. Thwaites, by H. Cuming.

UNIO MELLEUS.—Testâ sulcatâ, ellipticâ, subinflatâ, valdè inæquilaterali; valvulis subcrassis, anticè crassioribus; natibus subprominentibus, ad apices minutè undulatis; epidermide melinâ, obsoletè radiatâ, nitidâ; dentibus cardinalibus subgrandibus, erectis, crenulatis, in utroque valvulo duplicibus; lateralibus sublongis, subrectis, in utroque valvulo duplicibus; margaritâ salmonis colore tinctâ et iridescente.

Hab.— ——? H. Cuming.

UNIO DYSONII.—Testâ sulcatâ, ellipticâ, subinflatâ. inæquilaterali, posticè subbiangulari; valvulis subcrassis, anticè crassioribus; natibus prominulis, ad apices lævibus; epidermide stramineâ, eradiatâ; dentibus cardinalibus crassiusculis, erectis, crenulatis, in utroque valvulo duplicibus; lateralibus longis subcurvisque; margaritâ argenteâ et valdè iridescente.

Hab.—Honduras. D. Dyson.

UNIO DEMARARAENSIS.—Testâ sulcatâ, rhomboido-oblongâ, subinflatâ, inæquilaterali, posticè obtusè angulatâ; valvulis crassiusculis; natibus prominulis, ad apices undulatis divergentibus; epidermide olivo-fuscâ, eradiatâ; dentibus cardinalibus crassiusculis, erectis, striatis, in utroque valvulo duplicibus: lateralibus longis subcurvisque; margaritâ albâ et iridescente.

Hab.—Demarara. H. Cuming.

UNIO MAURITIANUS.—Testâ lævi, ellipticâ, compressâ, inæquilaterali; valvulis pertenuibus; natibus prominulis; epidermide olivo-luteâ, nitidâ, obsoletè ra-

dìatâ; dentibus cardinalibus minimis, compressis, obliquis; lateralibus longis, acicularis subcurvisque; margaritâ albâ et paulisper iridescente.
Hab.—Island of Mauritius. H. Cuming.

Unio vittatus.—Testâ crebrè et leviter sulcatâ, ellipticâ, inflatâ, inæquilaterali; natibus prominentibus; epidermide luteo-olivâ, nitidâ, eradiatâ, transversè vittatâ; dentibus cardinalibus sublongis, compressis, obliquis; lateralibus longis, lamellatis subcurvisque; margaritâ albâ et iridescente.
Hab.—Australia. H. Cuming.

Unio persulcatus.—Testâ crebrè sulcatâ, oblongâ, valdè inæquilaterali, compressâ, posticè subangulatâ; valvulis subcrassis; natibus prominulis; epidermide virido-fuscâ, radiis capillaris; dentibus cardinalibus magnis, sulcatis crenulatisque; lateralibus sublongis rectisque; margaritâ purpureâ et valdè iridescente.
Hab.—Mexico. Prof. Hanley.

Unio Shanghaiensis.—Testâ lævi, valdè transversâ, valdè inæquilaterali, inflatâ, cylindraceâ, posticè subbiangulatâ; valvulis crassiusculis, anticè crassioribus; natibus subprominentibus, ad apices corrugatis et plicatis; epidermide tenebroso-olivâ, nitidâ, obsolete radiatâ; dentibus cardinalibus parviusculis, compressis, crenulatis, rectis, in utroque valvulo duplicibus; lateralibus prælongis, lamellatis rectisque; margaritâ argenteâ et valdè iridescente.
Hab.—Shanghai, China. H. Cuming.

Unio Layardii.—Testâ lævi, ellipticâ, inflatâ, posticè obtusè angulatâ, anticè regulariter rotundatâ, subæquilaterali; valvulis crassiusculis; natibus prominulis; epidermide valdè politâ, micante, tenebroso-fuscâ, nigricante; dentibus cardinalibus longis, lamellatis, obliquis, in valvulam dextram duplicibus; lateralibus longis subcurvisque; magaritâ albâ et iridescente.
Hab.—Ceylon. Frederick Layard.

Unio japanensis.—Testâ plicatâ, oblongâ, anticè subsulcatâ, subcompressâ, posticè subbiangulatâ, valdè inæquilaterali; valvulis crassiusculis, anticè paulisper crassioribus; natibus prominulis; epidermide tenebroso-fuscâ, micante; dentibus cardinalibus subgrandibus, elevatis, crenulatis, in utroque valvulo duplicibus; lateralibus longis subcurvisque; margaritâ albâ et valdè iridescente.
Hab.—Japan. H. Cuming.

Unio Sumatrensis.—Testâ plicatâ, subtriangulari, subventricosâ, posticè subbiangulatâ, inæquilaterali; valvulis subcrassis; natibus subprominentibus; epidermide micante, luteo-olivâ, posticè virente; dentibus cardinalibus lamellatis, compressis, obliquis, in utroque valvulo duplicibus; lateralibus subbrevibus curvisque; margaritâ albâ et iridescente.
Hab.—Sumatra. H. Cuming.

Unio Rowellii.—Testâ sulcatâ, ellipticâ, subinflatâ, posticè obtusè angulatâ, inæquilaterali; valvulis subcrassis, anticè paulisper crassioribus; natibus prominulis, ad apices undulatis; epidermide rufo-fuscâ, obsoletè radiatâ; dentibus cardinalibus compressis, elevatis, crenulatis, in utroque valvulo duplicibus, lateralibus subrectis sublongisque; margaritâ albâ et iridescente.
Hab.—Chagres River, New Granada. Rev. Joseph Rowell.

Unio Wilsonii.—Testâ crebrè et leviter sulcatâ, transversè ellipticâ, subinflatâ, valdè inæquilaterali; valvulis tenuibus; natibus prominentibus, ad apices lævibus; epidermide olivo-viridescente, nitidâ, obsoletè radiatâ; dentibus cardinalibus parvis, lamellatis et obliquis; lateralibus longis, acicularis subrectisque; margaritâ cæruleo-albâ et iridescente.
Hab.—Eastern Branch of Isaac's Plain. New South Wales, T. B. Wilson, M. D.

ANODONTA DAHOMEYENSIS.—Testâ lævi, transversâ, subinflatâ, ad latere compressâ, ad basim emarginatâ, valdè inæquilaterali; valvulis tenuibus; natibus subprominentibus; epidermide tenebroso-olivâ, striatâ, eradiatâ; margaritâ cæruleo-albâ et iridescente.

Hab.—Dahomey, West Africa. Mr. Fraser, by H. Cuming.

ANODONTA SENEGALENSIS.—Testâ lævi, transversâ, subinflatâ, ad latere vel planulatâ vel compressâ, ad basim subemarginatâ, valdè inæquilaterali; valvulis crassiusculis; natibus subprominentibus, ad apices minutè et obliquè undulatis; epidermidè tenebroso-viridescente, nitidâ, eradiatâ; margaritâ vel cæruleo-albâ vel salmonis colore tinctâ et iridescente.

Hab.—Senegal. J. C. Jay, M. D., E. Verreaux and H. Cuming.

Descriptions of Two New Species of UNIONES, from Georgia.

BY ISAAC LEA.

UNIO FIBULOIDES.—Testâ lævi, subrotundâ, inflatâ, subæquilaterali; valvulis crassis, anticè paulisper crassioribus; natibus crassis et valdè prominentibus; epidermide vel fuscâ vel luteo-fuscâ, anticè striatâ; dentibus cardinalibus crassis, compressis crenulatisque; lateralibus curtis, crassis, rectis granulatisque; margaritâ albâ et iridescente.

Hab.—Connasauga River, Georgia. Bishop Elliott.

UNIO COMPACTUS.—Testâ lævi, triangulari, subinflatâ, ad latere planulatâ, posticè angulatâ, inæquilaterali; valvulis crassis; natibus elevatis; epidermide luteo-olivâ, radiis maculatis capillaris creberrimis; dentibus cardinalibus parvis, erectis, in utroque valvulo duplicibus; lateralibus curtis, crassis rectisque; margaritâ albâ et iridescente.

Hab.—Etowah River, Georgia. Bishop Elliott, and Rev. G. White.

Descriptions of seven new species of UNIONES from South Carolina, Florida, Alabama and Texas.

BY ISAAC LEA.

UNIO CACAO.—Testâ lævi, oblongâ, subquadratâ, compressâ, ad latere planulatâ, posticè obtusè angulatâ, inæquilaterali; valvulis subcrassis, anticè crassioribus; natibus prominulis; epidermide castaneâ, supernè micante, infernè striatâ; dentibus cardinalibus crassiusculis, striatis, suberectis, in utroque valvulo duplicibus; lateralibus curtis, lamellatis rectisque; margaritâ purpurescente et valdè iridescente.

Hab.—Chacktahachie River, West Florida. Major Le Conte.

UNIO HEPATICUS.—Testâ lævi, ovato-oblongâ, compressâ, posticè latè biangulatâ, inæquilaterali; valvulis subtenuibus; natibus prominulis; epidermide micante, hepaticâ, vel eradiatâ vel obsoletè radiatâ; dentibus cardinalibus parvis, subelevatis, striatis, in utroque valvulo duplicibus; lateralibus longis, lamellatis subrectisque; margaritâ pupurescente et valdè iridescente.

Hab. Salkakatche River, South Carolina. J. Postell.

UNIO VIRIDIRADIATUS.—Testâ lævi, latè ellipticâ, compressâ, posticè dilatatâ et obtusè angulatâ, anticè regulariter rotundatâ, valdè inæquilaterali; valvulis subtenuibus; natibus prominulis, ad apices minutè et irregulariter undulatis; epidermide subnitidâ, radiis crebris capellaris; dentibus cardinalibus parvis, crenulatis, in utroque valvulo duplicibus; lateralibus longis, lamellatis subrectisque; margaritâ purpureâ et valdè iridescente.

Hab. Big Uchee, Alabama, near Columbus, Georgia. G. Hallenbeck.

UNIO MACRODON.—Testâ lævi, triangulari, compressâ, subæquilaterali, posticè

angulatâ; valvulis subcrassis; natibus subelevatis, ad apices minutè undulatis; epidermide luteolâ, striatâ; dentibus cardinalibus permagnis, subcompressis, elevatis, obliquis crenulatisque; lateralibus longis rectisque; margaritâ argenteâ et iridescente.

Hab. Rutersville, Texas. Prof. C. G. Forshey.

UNIO HOUSTONENSIS.—Testâ lævi, subrotundâ, subinflatâ, æquilaterali, ad latere paulisper planulatâ; valvulis subcrassis, anticè crassioribus; natibus elevatis, ad apices paulisper undulatis; epidermide lævi, virido-luteâ, vel eradiatâ vel obsoletè radiatâ; dentibus cardinalibus magnis, erectis, crenulatis; lateralibus curtis subrectisque; margaritâ argenteâ et iridescente.

Hab. Houston, Texas. F. Moore, M. D.

UNIO RUTERSVILLENSIS.—Testâ lævi, transversè ellipticâ, subinflatâ, valdè inæquilaterali, posticè obtusè angulatâ; valvulis subtenuibus, anticè paulisper crassioribus; natibus prominulis, ad apices regulariter et elegantissimè undulatis; epidermide vel fuscâ vel luteo-fuscâ et valdè radiatâ; dentibus cardinalibus parvis, compressis, acuminatis, crenulatis, in utroque valvulo duplicibus; lateralibus longis, lamellatis subcurvisque; margaritâ ceruleo-albâ et valdè iridescente.

Hab. Rutersville, Fayette Co., Texas. Prof. C. G. Forshey.

UNIO FORSHEYI.—Testâ valdè et minutè tuberculatâ, subquadrangulari, compressâ, subequilaterali, posticè subbiangulatâ; valvulis subcrassis, anticè crassioribus; natibus subelevatis, ad apices acuminatis et elegantissimè perundulatis; epidermide virido-luteâ, substriatâ, obsoletè radiatâ, submicante; dentibus cardinalibus subgrandibus, erectis, crenulatis, in utroque valvulo duplicibus, lateralibus rectis brevibusque; margaritâ argenteâ et paulisper iridescente.

Hab. Fayette Co., Texas. Prof. C. G. Forshey.

Description of a Third Genus of HEMIRHAMPHINÆ.

BY THEO. GILL.

After the transmission to the Academy of Natural Sciences of the paper descriptive of the genus *Hyporhamphus*, Mr. James C. Brevoort placed in my hands a species closely resembling those fishes which have been described as *Hemirhamphus longirostris* and *H. macrorhynchus*. Mr. Brevoort at the same time called my attention to the peculiar dentition of the species, there being evidently tricuspidate teeth in the lower jaw, while those in the upper were simply conical. On an examination of the descriptions of the above mentioned species, as given in the "Histoire Naturelle des Poissons," it is to be remarked that no allusion is made to the *shape* of the teeth, but that they are in each described as being very fine, immediately after the statement of the size of the upper jaw. It is then to be presumed that M. Valenciennes only noticed the conical teeth, for one of the characters that he has given of the genus is founded on the presence of granular or conical ones. Could Valenciennes have overlooked the teeth of the lower jaw, and only examined those of the upper? It appears to me possible that he did, for it is scarcely to be believed that a fish so closely resembling *Hemirhamphus longirostris* as the present species, could differ from it in such important parts. I nevertheless offer this opinion with diffidence. As Valenciennes has remarked, the teeth are very small, and as their forms can only be discerned through a magnifier, they might have been easily overlooked, unless the attention of the observer was particularly attracted to them. The peculiarity of the different structure of the teeth in each jaw would scarcely have been suspected by the naturalist as occurring in this tribe. If this supposition is correct, as to the *Hemirhamphus longirostris* and *H. macrorhynchus*, those species should be withdrawn from the genus *Hemirhamphus* and placed in an allied one. Valenciennes would probably have himself done this, if he had

been aware that any such peculiarity as that signalized had existed. Certain it is, that the species to be now described differs from *Hemirhamphus*, not only in the dentition, but even more strikingly in general form, which at once distinguishes it from that genus, as it should be restricted, and approximates it to the long billed and slender *Hemirhamphus longirostris*. In the typical *Hemirhamphi* the body, although elongated and nearly uniform, is quite robust. In the present genus (*Euleptorhamphus*) the proportional height is about half of that in *Hemirhamphus*, and the beak is also much elongated. The pectorals are again much longer than those of *Hemirhamphus*, and are pointed at their extremities, and they have been even compared by Valenciennes to those of the *Exocœti*. These characters sustain us in the belief that it forms the type of a natural genus, and we now give its *generic* characters, those appertaining to the subfamily being omitted.

EULEPTORHAMPHUS Gill.

Body very slender and elongated, covered with large and high scales. The ensiform, lower jaw, very long and slender, greatly exceeding the length of the head. Teeth very small and panciserial in each jaw, tricuspidate in the lower and subconical in the upper. Pectoral fins elongated and pointed. Anal with all its rays, except the most anterior, simply branched.

EULEPTORHAMPHUS BREVOORTII Gill.

The height between the vertical fins is contained between twelve and thirteen times in the length from the opercular margin to the base of the caudal fin. The head, from the end of the upper jaw to the margin of the operculum bears a proportion to the length of the trunk of one to six and a third. The beak forms about three-tenths of the *extreme length* inclusive of the caudal fin.

The eye is moderate, its diameter forming little, if at all, more than a fourth of the head's length (exclusive of the beak). The interorbital space is equal to a diameter. The pectorals slightly exceed three-elevenths of the length of the trunk. The ventrals are nearer to the margin of the operculum than to that of the caudal fin, and are very small, their length only equalling a sixth of the pectorals. The dorsal commences nearer to the point of the caudal than to the bases of the pectorals; its base is about as long or even longer than the length of the pectorals; about three of its rays are in advance of the anal, and its last ray is above or a little behind that of the same fin.

In the number of rays this species does not differ essentially from its congeners.

D 22; A 22; C 3, I, 8, 9, I, 5; P 8; V 6.

The scales appear to be firmly adherent to the body, especially on the silvery portion. The color is tawny-yellow on the back and inferiorly on the tail; the head and the rest of the sides are brilliant silvery; the silvery band is quite straight above; the beak is light or tawny-brown.

It appears that *Euleptorhamphus Brevoortii* is consequently more nearly allied to *E. longirostris* of Cuvier than to the *E. macrorhynchus*, the former offering no important difference in its relative height, which is said to be comprised thirteen times in the trunk, measured from the operculum to the root of the tail; in *E. macrorhynchus* the height is not comprised much more than nine times in the same length. With the latter, it is therefore unnecessary to compare the present species; from the former, it appears to differ specifically in some of its proportions. The beak in *E. longirostris* is said to be a quarter of the entire length; in *E. Brevoortii* it is three-tenths, or a little less than a third, and is consequently almost as long proportionally as *E. macrorhynchus*. The eye in *E. longirostris* is a third of the head's length in diameter; in *E. Brevoortii* it is only a quarter. The other variations in dimensions would not be sufficient to specifically distinguish the two fishes, but as they do not very widely differ in size, the variations that have been stated appear to be specific and not the results of

age. Valenciennes says that the scales of E. l o n g i r o s t r i s appeared to him to fall easily. The scales of E. B r e v o o r t i i appear to me to be more than usually adherent. If we are both correct, this difference will be important as specific. The two fishes finally appear to differ in color, but the one that has been above described has been apparently long preserved in alcohol.

The habitat of this species is unknown; the species allied to it have been hitherto found only in the Oriental seas.

ICHTHYOLOGICAL NOTICES.

BY CHARLES GIRARD, M. D.

LX. A species of *Fundulus*, closely allied to *F. grandis*, and of which we have given a good figure of either sex, on Plate xxxvi of the "Ichthyology of the United States and Mexican Boundry," was recently collected in Charlotte Bay, Fla., and sent to the Smithsonian Institution.

The specimens obtained are of the male sex, the largest one measures four inches and a half in total length, the head forming a little more than the fourth of it. The eye is large and circular, the diameter of the orbit entering about four times in the length of the side of the head. The maxillar teeth are rather small and inconspicuous. The body has not the plump appearance of *F. grandis;* its greatest depth is less than the fourth of the total length. The dorsal and anal fins are narrower than in *F. grandis.* The anterior margin of the anal is nearer the posterior margin of the caudal than the apex of the snout; that of the anal is equidistant between the pupil and the margin of the caudal. The latter is rounded off or subtruncated. The anal is inserted somewhat more anteriorly with reference to the dorsal than in *F. grandis*, and the tips of the rays of the dorsal project a little further than those of the anal fin. The ventrals are possibly smaller than in *F. grandis*, their extremities not reaching quite the vent. The pectorals are of moderate size and extend as far back as a vertical line drawn at the origin of the ventrals. The rays are :— D 12; A 11; C 2, 1, 8, 8, 1, 2; V 6; P 1, 16. The scales are deeper than long, but proportionally less so than in F. *grandis.* The head, dorsal region and flanks are blackish brown, metallic white spots being scattered over the sides of the body and tail. The abdomen is yellowish white The dorsal, caudal, and anal fins olivaceous, checkered with black and white, the ventrals and pectorals being olivaceous.

The name of *Fundulus floridensis* is bestowed upon this species.

LXI. We owe to our friend Dr. Thomas Webb, a species of *Cyprinodon*, collected by him in the neighborhood of San Diego, Cal., while attached to the U. S. and Mexican Boundary, under ex-Commissioner R. R. Bartlett.

It may easily be distinguished from its congeners in North America, by its uniform system of coloration which exhibits neither bands nor spots. The general aspect of its body is rather short and deep, except in the young which assume a subfusiform appearance. The largest specimens which we have examined measure about an inch and a half in total length. The head constitutes the fourth of the length, the snout being abruptly rounded off. The mouth is, proportionally speaking, of medium size; whilst the eye is rather small, subcircular; its diameter entering three times and a half in the length of the side of the head. The dorsal fin is higher than long, and superiorly convex; its anterior margin being nearer the apex of the snout than the posterior margin of the caudal. The anal fin is nearly as large as the dorsal, deeper than long, inferiorly convex, particularly upon its posterior half. The caudal is posteriorly truncated, nearly linear. The ventrals are small, project beyond the vent and reach almost the origin of the anal. The pectorals are well developed, rounded off, extending as far as a vertical line drawn at the insertion of the ventrals. The rays are :—D 10 + 1; A 11; C 3, 1, 8, 8, 1, 3; V 7; P 12.—The

scales are much deeper than long, anteriorly truncated and posteriorly rounded off or convex. The color is olivaceous brown, with a dark greyish tint along the back, and a golden tint beneath.

We propose calling this species *Cyprinodon californiensis.*

LXII. Another *Cyprinodon*, the largest species so far observed in North America, was collected by Mr. John Potts, in Chihuahua river. Specimens of the male sex measure two inches and a half in total length. The head, which constitutes somewhat more than the fourth of the total length, is rather large, the snout being abbreviated and rounded off. The eye is of moderate development, since its diameter enters four times in the length of the side of the head. The mouth is of medium size. The dorsal region between the nape and the origin of the dorsal fin is very convex; the depth, measured across the latter region, is a good deal more than the third of the total length. The origin of the dorsal fin is nearer the insertion of the caudal fin than the apex of the snout, the fin itself is higher than long, superiorly convex, the first and second rays being the shortest. The posterior margin of the caudal is subtruncated. The anal has the same shape and structure as the dorsal, but is a much smaller fin. The ventrals overlap the vent, reaching almost the anterior margin of the anal. The pectorals are well developed, rounded off, and extend further back than a vertical line drawn at the insertion of the ventrals. The rays are:—D 12; A 12; C 5 1, 7, 7, 1, 4; V 6; P 14.—The body of the female sex is not so deep as in the male, although the dorsal region is convex, resembling somewhat *C. macularius*, figured on plate xxxvii, of the Ichthyology of the United States and Mexican Boundary Survey. The dorsal and anal fin are likewise much smaller than in the male and composed each of eleven rays instead of twelve; the upper edge of the dorsal being sublinear instead of being convex.

The ground color is olivaceous yellow with a golden reflect, much brighter beneath than above, where a greyish tint predominates. The adult male is nearly unicolor; the base of the caudal fin above is speckled with black, whilst its posterior margin is jet black. In its immature condition the male sex exhibits transverse fasciæ of blackish brown like the female, which is moreover maculated along the flanks. The base of the caudal is likewise speckled in the female, but the posterior edge of its caudal is not margined with black. On the other hand, a black spot may be seen at the posterior portion of the dorsal with specks of the same tint along its base.

We have bestowed the name of *Cyprinodon eximius* upon the species which is here described.

LXIII. The sun fish described by S. F. Baird, under the name of *Pomotis chætodon*, in the ninth annual report of the Board of Regents of the Smithsonian Institution, 1855, 324, possessing all the generical features which we have lately assigned to the genus *Bryttus* in the report upon the fishes collected during the various Pacific Railroad Surveys, that species we shall henceforwards call *Bryttus chætodon.*

LXIV. The Atlantic coast of the United States furnished a small herring, which was first indicated by Mitchill under the name of *Clupea teres.* DeKay, in his Fauna of the State of New York, has placed it in the genus *Alosa.* We have examined a series of specimens of that fish, collected by S. F. Baird, along the coast of New Jersey. The largest ones measure about four inches and a half in total length; all of them in the most perfect state of preservation. Finding teeth upon the maxillar bones, the tongue, the palatines, and the pterygoidians, whilst the vomer is toothless, we propose referring that species to the genus *Harengula* of Prof. Valenciennes, established in the "Histoire Naturelle des poissons" upon the characters just alluded to, and to call it *Harengula teres.*

LXV.—The fresh water siluroid, described by Lesueur under the name of

Pimelodus lemniscatus, in the "Mémoires du Muséum d'Histoire Naturelle," belongs, truly speaking, to the genus *Noturus* of Rafinesque, and which was at one time supposed of being founded upon young specimens of Pimelodi, but is now admitted to be a distinct genus, although resembling in its full grown condition the immature state of *Pimelodus*, properly so called. The genus *Noturus* is thus made to include a second species under the name of *N. lemniscatus*. We venture to say that Lesueur's specimens were procured in Pennsylvania, and not in the southern States, as assumed by Dekay.

LXVI.—The fish described by F. B. Hough, under the name of *Pimelodus gracilis*, in the Fifth Ann. Rep. of the Reg. of the Univers. of N. Y., 1852, p. 26, is a very characteristic species, but its specific name is unfortunately preoccupied in the genus *Pimelodus*. We propose, therefore, to designate it in future under the appellation of *Pimelodus houghi*. We have examined specimens collected at Sommerville, St. Lawrence Co., N. Y. by Mr. Hough himself; others from Foxburgh, Pa., collected by S. F. Baird; and others still, from Ogdensburg: they are all preserved in the Museum of the Smithsonian Institution.

LXVII.—Dr. Hoy has collected in the neighborhood of Racine, Wis., specimens of a species of *Pimelodus*, which we propose dedicating to him; hence calling it *P. hoyi*. The head constitutes a little less than the fourth of the total length, its upper aspect being longer than broad. The upper jaw is somewhat longer than the lower one. The eyes are of medium size; their diameter entering six times and a half in the length of the side of the head, and four times in the interocular space. The anterior margin of the dorsal fin is nearer the apex of the snout than the origin of the adipose fin. The caudal is slightly emarginated, subcrescentic upon its posterior margin; it constitutes the sixth of the whole length of the fish. The anal fin is deep and rounded off upon its exterior margin; its base is somewhat less than the fifth of the entire length. The formula of the rays is:—D I, 7; A 23; C 2, 1, 7, 7, 1, 3; V 8; P I, 9. The specimens observed measure about a foot in total length; their coloration is of that uniform type common to various species.

LXVIII.—Specimens of a species, more closely allied in its general appearance to *P. hoyi* than any other of its congeners, were caught in Root River, near Racine, Wis., by S. F. Baird.

The head forms a little more than the fourth of the total length; its upper aspect is as broad as long. The jaws are equal. The eyes are of medium size, their diameter being contained eight times in the length of the side of the head, and four and a half times along the interocular space. The anterior margin of the dorsal fin is nearer the origin of the adipose than the apex of the snout. The caudal fin, which constitutes the sixth of the total length, is subcrescentic upon its posterior margin. The anal fin is deep and rounded off exteriorly; its base being contained five and a half times in the entire length. The rays are: D I, 6; A 20; C 3, 1, 8, 8, 1, 4; V 8; P I, 9.

We propose calling this species *Pimelodus confinis*.

LXIX.—A small species having the general appearance of *Pimelodus cupreus* of Rafinesque, was collected by Robert Kennicott, Aux Plaines, Ill. The chief distinguishing mark between the two species consists in the relative length of the jaws, the lower one in *P. cupreus* being shorter than the upper, whilst they are both equal in the species here alluded to, and which we call *P. cupreoides*. The head forms a little less than the fourth of the total length; it is as long as broad, and rounded off upon the snout. The eyes are of medium size: their diameter being contained seven times in the length of the side of the head, and about four times along the interocular space. The anterior margin of the dorsal fin is nearer the snout than the adipose. The caudal is posteriorly rounded off, forming a little less than the sixth of the entire length, and shorter than

the base of the anal, which enters in the total length somewhat more than four times only.

The color is of a uniform, dark blackish-brown tint.

LXX.—The cat fish figured and described by DeKay, under the name of *Pimelodus catus*, Cuv. and Val., belongs to a species quite distinct from the one just alluded to. The head forms a little more than the fourth of the whole length: it is broader than long. The lower jaw is longer than the upper. The eyes are rather small; their diameter entering about nine times in the length of the side of the head, and five and a half times across the interocular space. The anterior margin of the dorsal fin is equidistant between the apex of the snout and the anterior margin of the adipose. The caudal, which forms about the sixth of the total length, is subtruncated posteriorly. The base of the anal enters likewise six times in the total length.

This species might be called *P. dekayi;* the specimens observed were collected at Oswego, Lake Ontario, and in four mile creek, near Oswego, by S. F. Baird.

LXXI.—The true *Pimelodus catus* is a southern species, widely distinct from the above. It can be distinguished by the following characters: the head is contained four times and a half in the entire length; it is as long as broad, the length being taken from snout to occiput. The jaws are equal. The eyes are small; their diameter enters also nine times in the length of the side of the head, and five and a half times across the interocular region. The anterior margin of the dorsal fin is nearer the apex of the snout than the origin of the adipose. The caudal is posteriorly rounded off, and contained five and a half times in the total length. The base of the anal enters but four times in the same length.

LXXII. The hydrographic basin of the Chesapeake has furnished a species of cat fish, popularly known as the "Channel cat," or "Mud cat." The head, which is longer than broad, forms a little less than the fourth of the total length. The upper jaw is somewhat longer than the lower one. The eyes are rather large; their diameter being contained seven times in the length of the side of the head, and four times and a half across the interocular space. The anterior margin of the dorsal fin is equidistant between the apex of the snout and the origin of the adipose. The posterior edge of the caudal is moderately emarginated; the fin itself constituting not quite the sixth of the total length. The base of the anal is somewhat shorter than the dorsal. The rays are:—D I, 5 + 1; A 20; C 3, 1, 8, 7, 1, 4; V 8; P I, 9.—The upper regions are bluish black, whilst the abdomen is whitish. Specimens were obtained in the Potomac river, in deep run, a tributary of Patapsco river, and at Carlisle, Pa.

We propose the name of *Pimelodus lynx* for this species.

LXXIII. Another species, to which we apply the name of *Pimelodus puma*, was collected by myself in Charleston, S. C. The head constitutes the fourth of the entire length; it is also longer than broad. The jaws are equal. The eyes are of medium size; their diameter entering about eight times in the length of the side of the head, and five times across the interocular space. The posterior margin of the dorsal is equidistant between the apex of the snout and the posterior flap of the adipose. The caudal is subconvex posteriorly; it constitutes about the sixth of the total length. The base of the anal does not enter quite four times and a half in the total length.

LXXIV. We have likewise collected in Charleston, S. C., a cat fish, the general form of which is more slender than that of the preceding species; the anal fin is deeper and the caudal emarginated: features which will at once differentiate the species to which we give here the name of *Pimelodus vulpeculus*. The head, which is longer than broad, constitutes the fourth of the total length. The lower jaw is somewhat shorter than the upper one. The eyes are of medium

size; their diameter being contained about eight times in the length of the side of the head, and four times only across the interocular space. The anterior margin of the dorsal is somewhat nearer the apex of the snout than the adipose, which is smaller and inserted more anteriorly than in *P. puma*. The caudal fin enters five times and a half in the total length. The base of the anal is equal to the length of the caudal.

LXXV. A most characteristic species of cat fish has been collected in the neighborhood of Anderson, S. C.; specimens of which having been secured by Mrs. Daniel, were sent to Prof. S. F. Baird nearly eight years ago. The head which is longer than broad, is very much depressed, and contained about four times in the total length. The mouth is exceedingly broad and large; the jaws being equal. The eyes are large; their diameter entering six times and a half in the length of the side of the head, and three and a half times across the interocular space. The anterior margin of the dorsal fin is nearer the apex of the snout than the adipose fin. The caudal is posteriorly emarginated, and constitutes the sixth of the total length. The base of the anal is somewhat longer than the caudal.

In calling this species *Pimelodus platycephalus*, allusion is made to its most conspicuous character.

LXXVI. Specimens of a cat fish, collected in the Black Warrior and Bigsby rivers, Ala., were sent to the Smithsonian Institution by Prof. A. Winchell. The head is contained five times and a half in the entire length. The caudal fin is somewhat longer than the head. The eyes are very large; their diameter being contained but three times in the length of the side of the head: once in advance and once behind the orbit. The maxillar barbels extend beyond the middle of the length of the pectorals. The base of the anal fin enters four times in the total length of the fish. The rays are:—Br. VIII: IX; D I, 6; A 28; C 10, 1, 7, 8, 1, 10; V 8; P I, 9.—The dorsal region is of a pale red; the sides of the tail are silvery; the abdomen is whitish. Brown small spots and dots are occasionally scattered over the body. The maxillar barbels are blackish.

The name of *Pimelodus megalops*, refers to the development of the eyes, although other species may possess a similar feature to a lesser degree.

LXXVII. Finally we owe to Jas. Fairie, specimens of a cat fish collected by himself at Prairie mer Rouge, La. The species being new, we call it *Pimelodus gracilosus*. It has the general appearance of the preceding species, but the eyes are much smaller; their diameter entering four times in the length of the side of the head. The head itself forms the fifth of the total length. The anterior margin of the dorsal fin is nearer the apex of the snout than the origin of the adipose. The tip of the ventral fins extend beyond the origin of the anal. The rays are:—Br. VI: VI; D I, 6; A 28; C 5, 1, 7, 8, 1, 6; V 8; P I, 9.—The color is reddish brown above; the vertical fins are margined with black. The abdomen is yellowish; the horizontal fins being unicolor. The maxillar barbels are greyish black; the submaxillar ones are yellow.

The resignation of J. Aitken Meigs, M. D., as Librarian of the Academy, on account of business engagements, was accepted.

June 7th.

Mr. LEA, President, in the Chair.

Fifty-four members present.

A paper was presented for publication in the Journal of the Academy, entitled Synopsis of North American Sphingidæ, by Brackenridge Clemens, M. D.

And the following for publication in the Proceedings: Description of a new genus of Salarianæ, by Theo. Gill.

And were referred to Committees.

Dr. Leidy directed the attention of the Academy to a number of interesting fossils left by Prof. Emmons for the inspection of the members.

One of the specimens is the ramus of a lower jaw of a small insectivorous mammal. The Dromatherium sylvestre Emmons, from the coal of Chatham Co., N. C. It is of very great interest, as being the oldest known relic of a mammal. A second specimen, less well preserved, is presented this evening to the Academy by Prof. Emmons.

Other fossils consist of teeth, vertebræ, and fragments of other bones of Clepsysaurus, Rutiodon and Palæosaurus, also from Chatham Co., N. C.

There is also a good suite of the curious subsilurian fossil Palæotrochus, of which some of the specimens are detached, while others are imbedded in the quartzose rock.

Dr. L. further noticed a very large tooth, much mutilated and black in color, which was discovered by Prof. Emmons, in association with ear bones of cetacea, in the miocene deposits of North Carolina. The tooth probably also belongs to a cetacean, for which the name of Ontocetus Emmonsi is proposed.

The tooth is curved conical, and is compressed and fluted laterally. In its perfect condition it has been over ten inches in length, by about four inches in its greater diameter, and two and a half inches wide. It is composed of dentine, with an exterior comparatively thin layer of cement, and an interior comparatively large amount of osteo-dentine. The specimen appears to have lain long exposed to the attacks of living mollusks at the bottom of the miocene ocean, as it exhibits a number of excavations made by pholades or other allied genera.

Professor Emmons, at the meeting of May 24th, remarked that the debitumenization of coal was effected through the agency of heat, but he does not think that the debitumenization of anthracite is due to heat emanating from an incandescent body, whether that body be injected trap or other pyrocrystalline rocks. In his opinion the heat which debitumenized the coal of the anthracite region was disengaged or generated by the collision of the rocks enclosing it at the time of their upheaval. In support of this view he referred to the correlation of forces—the equivalent of heat, etc.—and stated he found by experiment, a year ago, that the volatile matter of the bituminous slates of North Carolina began to come off at 350°, and that it was all driven off paraphine, and all about 608°. Hence he inferred that coals are debitumenized at low temperatures, and that intense ignition is not required.

Professor Rogers objected to these views, and suggested that the non-conducting property of the rocks was an obstacle to the theory.

Mr. Lea, in accordance with a request made at a previous meeting, read the following notice of the late Alexander von Humboldt:

When one of the great luminaries of the scientific world has passed away, it is usual to take some notice of the loss sustained by those who were accustomed to benefit by the labors and instruction of the departed philosopher. It is rarely, very rarely, that science has been deprived of a mind so rich in various branches of human knowledge, as that of Alexander Von Humboldt, a native of Prussia, but belonging to the whole world of civilization. In what town or hamlet, where the European languages are understood, has not his name been familiar? Where has he not imparted new ideas to the inquiring mind?

Born in 1769, a year remarkable for the birth of many of the most distin-

guished men of the 18th century, viz., Cuvier, Scott, Bonaparte, Wellington, Schiller, Canning and Chateaubriand, few of them have left a more indelible mark than our associate.

His early travels brought him to this city more than half a century since, and before the foundation of our own Academy, of which he was made a "correspondent" in 1843.

Born in the highest rank of society with all the advantages of political preferment, he chose to labor in the walks of science. The friend of sovereigns, he was also the friend of the poorest student in the pursuit of knowledge. He was the same philosopher in the palace as in the humble hut. No man had greater advantages—no one had made better use of them. Unceasing in his scientific explorations, he exposed himself to the greatest hardships in his voyages and travels, at times braving the deadly malaria and the burning heats of the tropics, then scaling the summits of mountains before considered inaccessible to man. From these scenes he returned only to work up his abundant materials, which were more extensive and better selected than any before made; and this has been done in the most erudite manner and for the most useful purposes. His books and essays, which he leaves as a rich inheritance to the learned of all countries, will prove to be an immortal monument of his devotion to and his pre-eminence in science.

All countries claim him because he labored for all, and he fraternised with all their men of science. Of as easy access to the student of nature as to the most learned, he was amiable, courteous and generous. Well aware of what science was doing to promote the welfare and happiness of man, he, during the period of his long life, faithfully worked out his part without ostentation or pride. He loved his studies for their own sake, and in his brilliant intelligence most anxiously diffused that knowledge which he had acquired by his own great labors.

He was educated chiefly at Göttingen, under Blumenbach and other distinguished professors. Subsequently he studied under the great Werner, who gave such an impulse to geology towards the end of the last century. The eminent Von Buch—only recently dead, an associate of our Academy since 1840—became his intimate friend. In 1799 he sailed from Spain with his *fidus Achates*, Bonpland, and explored the rivers, mountains and plains of South America. Returning to Europe in 1804, he proceeded to Paris, where he remained until 1807, and published the "Voyage to the Equinoctial Regions of the New Continent." Here he formed those intimate associations with his co-laborers, Cuvier, Arago, Gay-Lussac, Latreille, &c., which he valued so highly, and here he commenced his "Cosmos." Eventually he took up his permanent residence in Berlin in 1847, avoiding all political preferment, but remaining in close intimacy with his sovereign, who was a learned man, and his personal friend, and valuing his society so much, he desired to have it daily when it suited the philosopher's convenience.

When I had the pleasure to see our illustrious associate in Berlin, in the summer of 1853, he was in his 84th year, but still rapid in his thoughts and active in his movements. He was then deeply engaged in the last volume of his "Cosmos," parts of which he showed to me, and expressed his great interest in the advance that science was making in the United States. This he spoke of with great warmth, and I had reason to believe that he felt a strong partiality to Americans. In this he united with the general German sentiment.

Humboldt was beloved and venerated by the population of Berlin and Potsdam, and he was followed to the grave by all that was great and good in the Capital of Prussia.

In conclusion I offer the following reolutions:—

Resolved, That in the decease of our "Correspondent" Baron Alexander Von Humboldt, we lose a scientific brother of no ordinary fame, and

one who, for nearly three-fourths of a century, had led in many branches of philosophy and useful learning.

Resolved, That we recognise no boundaries, no political or civil divisions in philosophy, but consider our eminent, distinguished and learned associate as belonging to us, as well as to the whole scientific world; and we are deeply sensible of the irreparable loss we have all sustained in being deprived of his further labors.

Resolved, That his illustrious example ought to spur us on to the scientific development of his favorite working field—the Western Continent—and although we no longer have his presence to cheer us on, we will not slacken in our endeavors to elucidate the Natural History, the Geology and Physical condition of our continent.

The resolutions were then adopted.

The following resolutions were adopted:

That the thanks of the Academy be tendered to Mrs. Sarah R. G. Beck for her valuable donation to the Library, presented this evening.

That the thanks of the Academy be tendered to the executors of the late Dr. Chas. F. Beck for the donation of a microscope presented this evening.

June 14*th*.

Mr. LEA, President, in the Chair.

Forty members present.

A paper was presented for publication in the Proceedings, entitled Herpetological Notices, by Charles Girard, M. D., and was referred to a Committee.

Dr. Uhler called attention to the anæsthetic effect of bisulphide of carbon, which he had accidentally experienced while engaged in its manufacture. The effect was very different from that of sulphydric acid, which accompanies the first distillation of the product, and no unpleasant results followed.

June 21*st*.

Mr. LEA, President, in the Chair.

Forty-five members present.

The following papers were presented for publication in the Proceedings:

Description of a new species of Callinidea, by Theo. Gill.

Description of new generic types of Cottoids from the collection of the North Pacific Exploring Expedition under Com. John Rodgers, by Theo. Gill.

Description of twelve new species of Unionæ from Georgia, by Isaac Lea.

And were referred to Committees.

A letter from Dr. C. A. Helmuth, dated Chicago, June 6th, 1859, was read, giving an account of a specimen of Hydaticus z o n a t u s, in which the head was only half the usual size, and enveloped in the skin

of the head of the larva. The oral organs were normal in the number of articulations, but the antennæ were folded up, and their joints are shorter and wider than usual: the palpi are also shorter than usual, and the last joint of the maxillaries is acuminate. The eyes of the imago were concealed by the larva skin, but on raising it are distinctly seen.

June 28th.

Vice President BRIDGES in the Chair.

Forty-four members present.

The report of the Biological Department for the present month was read.

On report of the Committee of the Biological Department the paper entitled An Experimental Examination of the physiological effects of Sassy Bark, the ordeal poison of the Western Coast of Africa, by S. W. Mitchell, M. D., and Wm. A. Hammond, M. D., U. S. A., was recommended for publication in a medical Journal.

The paper entitled, Synopsis of North American Sphingidæ, by Brackenridge Clemens, M. D., was ordered to be published in the Journal of the Academy.

And the following were ordered to be printed in the Proceedings.

Description of new generic types of COTTOIDS, from the collection of the North Pacific Exploring Expedition under Com. John Rodgers.

BY THEO. GILL.

CERATOCOTTUS Gill.

Body anteriorly robust, and as broad or broader than high; thence rapidly declining to the caudal fin. Lateral line with a row of bony scutellæ. Head large, with the width greater than the height or length; profile vertical; preopercle and suborbital extended outwards and forwards; preopercle armed with a long and immoveable spine, and with two smaller ones beneath; opercle with a muricated longitudinal rib and with a rounded membranous margin; subopercle with two diverging ridges terminating in spines; postorbital ridge well developed and elevated near the nape. Branchial apertures separated by a very wide isthmus. Branchiostegal rays six. Mouth moderate, horizontal. Dorsal fins entirely disconnected; first low and declining posteriorly; second oblong and corresponding to the anal. Caudal small and posteriorly subtruncated. Pectorals with broad and oblique bases, and with obliquely rounded margins. Ventrals small, moderately approximated, behind the bases of the pectorals; each with a spinous and three simple rays.

This genus is very closely allied to the *Aspicottus* of Girard, or *Clypeocottus* of Ayres, but is easily distinguished by the form of the head, and by the absence of teeth on the anterior portion of the vomer. The latter character has been overlooked by both Cuvier and Bennett, who have both described the species on which the genus is founded, and have referred it to *Cottus*, although one of the characters which Cuvier has assigned to that genus, rested on the presence of vomerine teeth.

A single species of this genus is known; it was long since described by Pallas under the name of Cottus d i c e r a u s.

Boreocottus Gill.

Body subcylindrical, rapidly declining to the caudal fin. Skin mostly naked, or with small and distant tubercles above the lateral line. Lateral line opening on the sides through small distant pores. Head large, depressed and subrhomboidal; nasal spines small; preopercle with two simple spines near the angle and two tubercles below; opercle with a longitudinal rib terminating in a spine, and with a rounded membranous margin; subopercle with a spine directed downwards. Postorbital longitudinal crests little developed. Mouth moderate. Teeth villiform, present on each jaw and on the front of the vomer. Branchiostegal membrane continuous under the throat, but attached along the middle of its length *almost* to its margin, and thus nearly restricting the branchial apertures to their respective sides. Branchiostegal rays six. Dorsals separate; the first low, highest at the middle. Ventrals small, moderately approximated and behind the pectorals; each with a spine and three soft rays.

B. axillaris Gill.—The color is purplish-blue, with whitish spots on the trunk, and with a darker band-like spot below the anterior portion of the second dorsal. The abdomen is whitish-yellow; the tail above the anal dotted, and higher up with dark spots confluent with the deep color of the sides. The first dorsal has two vertical dark bands; the second, three oblique ones. The caudal is blackish at the base and vertically banded with an undulating dark band at its posterior third. The anal has a very irregular row of spots. The pectorals are dark near the base, and have two oblique irregular bands on the posterior half, and a dark spot at their inferior axillæ.

D ix. 15.

One specimen caught with the Porocottus quadrifilis Gill, was obtained Behring's Straits.

Boreocottus is especially distinguished by its subrhomboidal head, simple preopercular spines, vomerine teeth and six branchial rays.

Porocottus Gill.

Body anteriorly subcylindrical, rapidly declining to the caudal. Skin naked. Lateral line opening by pores in raised papillæ, under a cutaneous keel. Head large and depressed, subrhomboidal. Nasal spines small. Preopercle with a single hooked spine. Opercle without a longitudinal rib or spine. Large pores under the lower jaw and on various parts of the head. Mouth moderate. Teeth on the jaws and front of the vomer. Branchiostegal membrane continuous under the throat, but attached along the middle to the throat, almost as far as the margin. Branchiostegal rays five. Dorsals separate; the first low; the second oblong and opposite the anal. Ventrals small, behind the pectorals, each with a spine and three soft rays.

The Porocotti have a strong resemblance to the Boreocotti, but are distinguished by the naked skin, hooked preopercular spine, the absence of a longitudinal rib on the opercle, numerous pores, and the presence of only five branchiostegal rays.

P. quadrifilis Gill.—The color is purple, irregularly spotted with black. There is a dark spot under the eye, and another on the maxillary. The dorsals, caudal and pectorals are irregularly variegated with black. On the pectorals there is a dark spot at the upper axilla, and another larger one towards the middle of the base. There is a slender superciliary filament and one on each side of the nape. It is to the presence of these that the specific name is designed to draw attention.

D viii. 13.

Specimens were obtained in Behring's Straits at the same time as Boreocottus axillaris Gill.

Descriptions of a New Species of CALLIANIDEA Ed.

BY THEO. GILL.

CALLIANIDEA LÆVICAUDA Gill.

The rostrum is equilaterally triangular, obtuse, and the carapace curved outwards from its base; the carapace over the external antennæ projects abruptly, and is separated from the margin above by a short fissure; the antero-lateral margins of the carapace are abruptly extended outwards, and thence curved obliquely downwards and posteriorly.

The large cheliped is smooth and polished, and is about twice as long as the carapace. The ischium is compressed and dilated anteriorly, with the articulating surface for the meros oblique and scarcely emarginate; the meros is nearly a third longer than the ischium, subovate, flat internally, convex externally above with its inferior margin anteriorly tridenticulate and hairy; the carpus is vertical, twice as high as long, and with its posterior side internally intersecting the anterior; its posterior articulating process is about as long as broad, and is divided into two unequal parts by a wide groove on its inner side; it projects acutely below, and is there tridenticulate; the manus is oblong, three times longer than the carpus, with parallel borders: its intero-superior border is provided with a long row of hairs, and its superior surface has a few distant fascicles of hair; the inferior margin is crenulated, and there is on each side a row of fascicles of hair; the digital process of the manus is about two-thirds as long as the manus itself, and it has five tubercles at its posterior half, the anterior of which is largest; anterior to this it is crenulated, as are also the margins on each side; the dactylus is moderately curved anteriorly, and crosses the digital process of the manus, leaving a hiatus; above, it is rounded, with a row of hairs on each side, the interior of which is very dense; below, the external margin of the cochleariform excavation is anteriorly crenulated, succeeded by a moderate tubercle, and posteriorly with two large ones, the posterior of which is rather an elevated apophysis; the internal border is anteriorly crenulated; a few pits with fascicles of hair are between the ridges of the cochleariform excavation and on each side.

The first pair of maxillipeds are smooth and polished on their external surfaces, and their internal margins are ciliated with long hairs. On the internal surface of the ischium there is a longitudinal, distinctly pectiniform ridge; the meros, carpus and manus have each a longitudinal row of hairs on their inner surface. The ischium is very slightly curved, and its margins are nearly parallel. The meros is shorter, with an oblique tooth internally on its anterior third, and thence more slender. The carpus is slender at its base, and internally very convex at its anterior half. The manus is narrowed from near the base to its termination. The dactylus is widest at the middle, and anteriorly rounded.

The exognath of the outer maxilliped extends beyond the middle of the meros.

The outer antennæ are about half as long as the internal, and the penultimate joint is the longest.

The median lamina of the caudal fin is rounded at the end, and its margin is not ciliated. The lateral laminæ increase progressively but little in length, and each one bears a ridge which is continued almost to the margin.

The feet of the second pair are provided with long hairs on their internal borders. The feet of the fourth pair are nearly as much compressed as the anterior, and the basilar article is much enlarged.

This species agrees very closely with the description of the Callianidea typa of Milne Edwards, (Hist. Nat. des Crustacès, vol. ii. p. 320) but on a comparison with the figures it appears to differ in the form of some of the joints of the

maxilliped, and in the presence of a tooth on the inner margin of the meros, as well as by the entire and plain margin of the median caudal lamina. Other differences seem to exist, which a comparison of the species would probably substantiate. The two species are also inhabitants of very distinct zoological regions, the Callianidea t y p a being a native of the shores of New Ireland, while the C. l æ v i c a u d a was obtained under rocks, within coral reefs, at the Island of Barbados, in the West Indies. The size of the two species is nearly similar.

Description of a new genus of SALARIANÆ, from the West Indies.

BY THEO. GILL.

ENTOMACRODUS Gill.

Body naked, elongated and slender, slowly declining to the caudal. Head obliquely compressed, oblong subquadrate, and with the profile vertical. Opercula unarmed. Eyes lateral, closely approximated, situated at the angle of the profile with the postocular region. No superciliary or nasal tentacles or appendages. Branchial apertures continuous under the throat. Branchial membrane free and dilatable. Branchiostegal rays six. Mouth moderate, with the contour of the upper jaw semicircular; upper jaw protruding beyond the lower. Lips moderate, uniform and free, concealing the teeth. Teeth labial and moveable, very slender and recurved, contiguous and uniserial. Lower jaw with an interior very large and recurved tooth on each side, which is received into a corresponding fossette of the palate. Dorsal fins disconnected, nearly equal to each other in length; the posterior free from the caudal. Anal equalling or exceeding the second dorsal. Caudal with its posterior margin obtusely rounded. Pectorals moderate, angularly rounded. Ventrals approximated, each with three simple rays, the internal of which is smallest.

On a comparison with a true species of *Salarias*, this genus is found to differ in its more elongated form, by the separate dorsals, and by the absence of any superciliary appendages. The canine teeth of the lower jaw are greatly developed, but they are found of nearly equal size in several species that have been referred to the genus *Salarias*. One of the species so distinguished is an inhabitant of the West Indian seas, and has been described under the name of *Salarias atlanticus*, by Cuvier and Valenciennes, in the Histoire Naturelle des Poissons. That species has an oblong body, superciliary appendages, and the dorsals connected at the base, and is therefore a true *Salarias*.

E. n i g r i c a n s Gill. The elongated body, from the snout to the end of the caudal fin, is between seven and eight times longer than it is high at the pectorals; its height at the caudal is about a thirteenth of the same length.

The head is subquadrate, and forms two-ninths of the total length. Its greatest height equals two-thirds of its length. It sides decline obliquely outwards and downwards.

The first dorsal commences near the nape, and two of its rays are in advance of the pectorals. The second dorsal commences immediately behind the first, and nearly over the fourth ray of the anal; it ceases some distance from the base of the caudal. The anal is more uniform in height than the dorsal, and ceases before it does. The caudal forms less than a fifth of the total length.

D 11, 15; A 17; P 15; V 3.

The general color of the body and fins is blackish.

A single specimen was caught in shallow water, at the island of Barbados, near Bridgetown.

[June,

HERPETOLOGICAL NOTICES.

BY CHARLES GIRARD, M. D.

I. BUFO LAMENTOR.—Upper surface of head nearly plane; skin thick, not adhering to the skull. Snout prominent. Parotids small, elongated. Tympanum small and subcircular. Tongue lanceolated, very free posteriorly where broadest. Upper jaw slightly emarginated. Limbs well developed, of stout appearance. First finger nearly as long as the third. Palm of hands tubercular. Two carpal disks. A membranous fold along the inner edge of the tarsus. Toes webbed to near their tips. Two moderately developed metatarsal tubercles. Sole of feet tubercular. Skin above glandulous; beneath warty. Color greenish brown, maculated with black above and beneath.

The head is broad and depressed; its length entering three times in that of the body, hence constituting the fourth of the entire length. Its upper surface is even, that is to say it exhibits neither crests nor grooves; the skin not adhering to the skull. The snout is rather prominent. The interocular space is wider than the eyelid. The nostrils are equidistant between the anterior rim of the orbit and the notch of the upper jaw. The tympanum is small and subcircular; its horizontal diameter being half that of the eye. The parotid glands are small, elongated, subovate; they are perforated by very small and distant pores, whilst their surface is either smooth or minutely granular.

The snout is large and the upper jaw but slightly emarginated; the tongue being elongated, subelliptical, and free upon the half or even two-thirds of its length. The inner nostrils are quite large and transversely elongated. The openings of the eustachian tubes are nearly equal in size to the inner nostrils.

The limbs are stout and very much developed; the anterior ones, when stretched backwards, extend beyond the groins, and the posterior ones when extended forwards project the extremity of three toes beyond the snout. Both fingers and toes, are depressed, whilst the tubercles under the articulations of the phalanges are rather conspicuous; the palm of the hands and the sole of the feet being coarsely granular. There are two carpal disks; the middle one is very large, whilst that at the base of the inner finger is but slightly larger than the subarticular knobs, in the young, proportionally much larger in the adult. The metatarsal tubercles are subconical; the innermost being somewhat larger than the others. The toes are palmated to near their tips, but the interdigital membrane is deeply and broadly emarginated.

Large glandular warts are spread irregularly over the head, body and limbs, more conspicuously over the back, and especially over the thighs. The intervening space exhibits miliary granules hardly perceptible to the unarmed eye. The inferior surface is wrinkled in various ways, spread over with granular warts and minute granules.

The ground color is greenish brown, somewhat lighter or whitish beneath. maculated with black all over the head, body and limbs, above as well as below. On the upper surface, the black patches generally surround the glandular warts, whilst on the sides they assume a meandering aspect. An exiguous dorsal light streak or filet is generally observed from the snout to the coccyx, although sometimes obliterated in whole or in part.

Specimens of this species were collected about Fort Bridger, Utah Territory, by Mr. Drexler, according to whom they are very common.

II. ENGYSTOMA TEXENSE.—Head constituting the third of the total length. Snout forming an acute triangle rounded at the summit. Gape of the mouth horizontal, its cleft extending to a perpendicular line drawn posteriorly to the pupil. Limbs slender; three carpal callosities, and one metatarsal tubercle. Palm of hands and sole of feet smooth. Skin smooth also. Color above light olivaceous brown, with a few black dots posteriorly; beneath uniform whitish.

This species is allied to *E. carolinense*, and differs from it by a more depressed and flattened head, a more truncated snout which, as usual, protrudes beyond the lower jaw. The body itself is likewise more depressed, and the limbs assume a slender appearance.

The head is continuous with the body, and constitutes about the third of their combined length. The cleft of the mouth does not extend as far back as in *E. carolinense*, since it corresponds to a perpendicular line drawn behind the pupil. The longitudinal diameter of the eye is equal to the distance between the orbit and the nostril. The interocular space, measured across the anterior rim of the orbits, is greater than the rostral space from the orbits forwards. The symphysis of the lower jaw presents the same structure as in the species just alluded to.

The skin is perfectly smooth throughout in all the specimens which we have examined; they were collected in April, and are, no doubt, liable to assume a rougher appearance during the hotter and more dry season of the year.

The ground color of the upper region of the head, body and limbs, is of a light olivaceous brown tint, anteriorly uniform, posteriorly besprinkled with small black spots or dots especially over the coccyx and thighs. A whitish tint pervades uniformly throughout the inferior regions.

Specimens of this species were procured in Texas, by Capt. John Pope.

Descriptions of Twelve New Species of UNIONES, from Georgia.

BY ISAAC LEA.

UNIO BALDWINENSIS.—Testâ oblongâ, compressâ, ad latere planulatâ, inequilaterali, posticè biangulatâ; valvulis subcrassis, anticè paulisper crassioribus; natibus prominulis; epidermide vel luteolâ vel fuscâ, eradiatâ; dentibus cardinalibus parviusculis, suboompressis, subelevatis, crenulatis, in utroque valvulo subduplicibus; lateralibus prælongis lamellatis subrectisque; margaritâ vel albâ vel salmonis colore tinctâ et valdè iridescente.

Hab.—Carter's Creek, Baldwin Co., Georgia. J. Postell.

UNIO VIRIDANS.—Testâ lævi, oblongâ, compressâ, ad latere planulatâ, posticè biangulata, anticè rotundatâ, valdè inequilaterali; valvulis subtenuibus; nâtibus prominulis, ad apices undulatis; epidermide fusco-viridi, striatâ, obsoletè radiatâ; dentibus cardinalibus parvis, striatis, crenulatis; lateralibus prælongis, lamellatis subrectisque; margaritâ vel albâ vel salmonia, sæpè purpureâ et valdè iridescente.

Hab.—Near Columbus, Georgia. G. Hallenbeck.

UNIO HALLENBECKII.—Testâ lævi, suboblongâ, compressâ, ad latere planulatâ, valdè inæquilaterali, posticè subbiangulari, anticè obliquè rotundata; valvulis subcrassis; natibus prominulis, ad apices crebrè et concentricè undulatis; epidermide rufo-fuscâ, micante, obsoletè radiatâ; dentibus cardinalibus subgrandibus, compressis, erectis, crenulatis, in utroque valvulo duplicibus; lateralibus longis, crassis rectisque; margaritâ vel purpureâ vel salmonis colore tinctâ et valdè iridescente.

Hab.—Flat Rock Creek, and Four Mile Creek, near Columbus, Georgia. G. Hallenbeck, and Bishop Elliott.

UNIO SALEBROSUS.—Testâ lævi, oblongâ, subcompressâ, ad latere planulatâ, posticè biangulatâ, anticè subtruncatâ, valdè inæquilaterali; valvulis subcrassis, anticè paulisper crassioribus; natibus subprominentibus, ad apices crebrè et concentricè undulatis; epidermide vel rufo-fuscâ vel luteo-fuscâ et valdè striatâ; dentibus cardinalibus subgrandibus, striatis, subelevatis crenulatisque; lateralibus prælongis subcurvisque; margaritâ vel albâ vel salmoniâ, rarè purpureâ et iridescente.

Hab.—Flat Rock Creek and Bull Creek, Georgia, G. Hallenbeck; and Chattahoochee River, near Columbus, Georgia. Bishop Elliott.

UNIO MODICELLUS.—Testâ lævi, subobliquâ, inflatâ, posticè subbiangulatâ, inæquilaterali; valvulis subcrassis, anticè crassioribus natibus prominentibus; epidermide vel luteâ vel luteo-olivâ, obsoletè radiatâ; dentibus cardinalibus parvis, compresso-conicis, crenulatis, in utroque valvulo duplicibus; lateralibus curtis, crassis, subrectisque; margaritâ albâ, posticè aureâ et iridescente.

Hab.—Connasauga River. Bishop Elliott, and Chattanooga River, Georgia. T. Stewardson, M. D.

UNIO LATUS.—Testâ lævi, transversâ compressâ, posticè obtusè angulatâ, valdè inæquilaterali; valvulis subtenuibus; natibus prominulis; epidermide luteolâ vel luteo-fuscâ, micante et perradiatâ; dentibus cardinalibus parvis, subcompressis, striatis; lateralibus prælongis, lamellatis subrectisque; margaritâ vel albâ vel purpurascente vel salmonis colore tinctâ et valdè iridescente.

Hab.—Savannah River, near Savannah, Georgia. Rev. G. White and Major Le Conte.

UNIO VERUTUS.—Testâ lævi, transversâ, subinflatâ, ad latere planulata, posticè obtusè angulatâ, anticè rotundatâ et valdè inæquilaterali; valvulis crassiusculis, anticè paulisper crassioribus; natibus prominulis, ad apices crebrè undulatis; epidermide rufo-fuscâ, radiatâ vel eradiatâ; dentibus cardinalibus subgrandibus, compressis subelevatis, striatis, in utroque valvulo duplicibus: lateralibus prælongis, lamellatis, subcrassis subcurvisque; margaritâ vel albâ vel salmoniâ vel purpurascente et valdè iridescente.

Hab.—Flat Rock Creek, near Columbus, Georgia. G. Hallenbeck.

UNIO JOHANNIS.—Testâ obliquo-ellipticâ, subinflatâ, posticè obtusè angulatâ, valdè inæquilaterali; valvulis subcrassis, anticè crassioribus; natibus subelevatis; epidermide tenebroso-viridi, ad umbones micante, posticè luteâ; dentibus cardinalibus subcrassis, compressis, suberectis; lateralibus curtis, rectis, subcrassis corrugatisque; margaritâ albâ et valdè iridescente.

Hab.—Connasauga River. Bishop Elliott; and Etowah River, Georgia. Rev. G. White. Alabama River. Dr. Budd.

UNIO RARENSIS.—Testâ lævi, oblongâ, subinflatâ, ad latere subimpressâ, posticè tumidâ et biangulatâ, valdè inæquilaterali, ad basim emarginatâ; valvulis subcrassis: natibus prominulis; epidermide rufo-fuscâ, substriatâ, obsoletè radiatâ; dentibus cardinalibus parvis, valdè crenulatis; lateralibus prælongis curvisque; margaritâ purpureâ et iridescente.

Hab.—Chattahoochee, near Columbus, and Rae's Creek, Georgia. Bishop Elliott.

UNIO INUSITATIS.—Testâ lævi, oblongâ, subcompressâ, ad latere planulatâ et contractâ, posticè obtusè biangulatâ, valdè inæquilaterali; valvulis crassius :ulis; natibus prominulis, ad apices minutè undulatâ; epidermide luteâ et fuscâ, supernè glabrâ, infernè tenebroso-striatâ, obsoletè radiatâ; dentibus cardinalibus parvis, accuminatis, crenulatis, in utroque valvulo duplicibus; lateralibus longis, lamellatis subrectisque; margaritâ vel albâ vel purpureâ vel salmonis colore tinctâ et valdè iridescente.

Hab.—Swift Creek, below Macon, Georgia. Bishop Elliott.

UNIO JONESII.—Testâ lævi, ellipticâ, subinflatâ, valdè inæquilaterali, posticè obtusè angulatâ; valvulis subtenuibus, anticè crassioribus; natibus prominulis, ad apices undulatis; epidermide luteâ, radiis interuptis; dentibus cardinalibus parviusculis, erectis, conicis; lateralibus sublongis, lamellatis rectisque; margaritâ vel albâ vel salmonis colore tinctâ et valdè iridescente.

Hab.—Uharlee Creek, Georgia. J. Postell.

UNIO QUADRATUS.—Testâ lævi, quadratâ, compressâ, ad latere planulatâ, inæquilaterali, posticè obtusè biangulatâ; valvulis subcrassis; natibus prominulis; epidermide vel rufo-fuscâ vel tenebroso-fuscâ et obsoletè radiatâ; dentibus cardinalibus subcrassis, compresso-conicis, crenulatis, in utroque valvulo duplicibus; lateralibus longis, lamellatis, crassis curvisque; margaritâ vel albâ vel purpurascente et iridescente.

Hab.—Carter's Creek. J. Postell; and Factory Creek, Georgia. G. Hallenbeck.

Catalogue of Birds collected on the Rivers Camma and Ogobai, Western Africa, by Mr. P. B. Duchaillu, in 1858, with notes and descriptions of new species.

BY JOHN CASSIN.

[Concluded.]

197. NUMIDA PLUMIFERA, Cassin.

Numida plumifera, Cassin, Proc. Acad. Philada. 1856, p. 321.
Journ. Acad. Philada. iv. pl. 2.

Specimens of both sexes in the present collection have the head quite naked, and appear to be in older plumage, than those described by me and figured as above. They do not differ, however, in any important character. From the Ogobai and Rembo.

198. PHASIDUS NIGER, Cassin.

Phasidus niger, Cassin, Proc. Acad. Philada. 1856, p. 322.
Journ. Acad. Philada. iv. pl. 3.

Specimens quite similar to that described by me, and figured as above. From the Camma and Ogobai.

199. FRANCOLINUS SQUAMATUS, Cassin.

Francolinus squamatus, Cassin, Proc. Acad. Philada. 1856, p. 321.

The only species of this genus received in Mr. Duchaillu's collections. From the Ogobai, and formerly from the Moonda and Cape Lopez.

Related to *F. ahantensis*, Schlegel, Beydr. Dierk. pl. 14, but distinct.

200. PELIPERDIX LATHAMI, (Hartlaub).

Francolinus Lathami, Hartl. Cab. Jour. 1855, p. 210.
Francolinus Peli, Schlegel, Beydr. Dierk. i, p. 50, pl. 15.

Numerous specimens of this little known and handsome bird are from the Camma and Ogobai. This is a very changeable species in its specific characters, especially in the markings of the under parts and the shade of color of the upper, and I am not quite sure that there are not two species in the present collection. The most obvious variation is in the size of the white circular and cordate spots on the under part of the body;—usually these are small and terminal, but specimens occur, of both sexes, in which they are large, and enclose a spot of black.

Prof. Schlegel's beautiful plate of this bird, cited above, represents it as lighter colored on the upper parts than is usual in the collections of Mr. Duchaillu.

201. SYNOICUS ADANSONII, (Verreaux).

Coturnix Adansonii, Ver. Rev. et Mag. Zool. 1851, p. 515.

One specimen only of this little species from the Ogobai, which is a female, but readily identified from M. Verreaux's types in the Acad. Mus. This handsome little bird is strongly allied to the other species of the genus *Synoicus*, Gould, and resembles several of them in general appearance.

202. OEDICNEMUS SENEGALENSIS, Swainson.

Oedicnemus senegalensis, Swains. B. of W. Afr. ii. p. 128, (1837).

Numerous specimens from the Camma and Ogobai, and previously received in Mr. Duchaillu's collections.

203. GLAREOLA CINEREA, Fraser.
Glareola cinerea, Fraser, Proc. Zool. Soc. London, 1843, p. 26.
Gray, Gen. iii. pl. 144.
From the Camma, and the only specimens received from Mr. Duchaillu. Evidently a peculiar and strongly marked species. In the specimens now before me the reddish collar on the back of the neck is narrower, and more strongly defined than as represented in Mr. Gray's very handsome plate, cited above. This bird belongs to the same group as the Asiatic *G. lactea*, Temm., which has been named by the Prince Bonaparte, *Galachrysia*.

204. LOBIVANELLUS ALBICEPS, (Gould).
Vanellus albiceps, Gould, Proc. Zool. Soc. London, 1834, p. 45.
Fraser, Zool. Typ. Birds, pl. 64.
From the Camma.

205. ÆGIALITES PECUARIUS, (Temminck).
Charadrius pecuarius, Temm. Pl. Col. v. pl. 183.
From the Camma.

206. ÆGIALITES MARGINATUS, (Vieillot).
Charadrius marginatus, Vieill. Nouv. Dict. xxvii. p. 138.
From the Camma. Scarcely in mature plumage, and not to be identified without exertion, but apparently this species, judging from the description by Dr. Hartlaub, Orn. W. Afr. p. 216, and the original as cited above.

207. ARDEA GOLIATH, Temminck.
Ardea goliath, Temm. Pl. Col. 474. Rüpp. Atlas pl. 26.
A single specimen of this gigantic Heron is labelled as having been obtained on the Camma. In adult plumage, and presenting no characters other than as described and figured as above.

208. EGRETTA FLAVIROSTRIS, (Wagler).
Ardea flavirostris, Wagler, Syn. Av.
From the Camma. Numerous specimens which appear to be this species.

209. EGRETTA BUBULCUS, (Savigny).
Ardea bubulcus. Savigny.
From the Camma.

210. BUTORIDES ATRICAPILLA, (Afzel).
Ardea atricapilla, Afzel.
Egretta thalassina, Swains. An. Menag. p. 333.
From the Camma.

211. CICONIA LEUCOCEPHALA, Gmelin.
Ciconia leucocephala, Gm. Syst. Nat. i. p.
Ciconia umbellata, Wagler, Syst. Av.
Buff. Pl. Enl. 906. Gray Gen. iii. pl. 151.
Numerous specimens from the Camma.

212. MYCTERIA SENEGALENSIS, Shaw.
Mycteria senegalensis, Shaw.
Ciconia ephippiorhyncha, Temm. Pl. Col. 64.
Vieill. Gal. pl. 255. Rüpp. Atl. pl. 3.
Several specimens from the Camma.

213. LEPTOPTILOS CRUMENIFERA, (Lesson).
"Ciconia crumenifera, Cuvier." Lesson, Traite, i. p. 585, (1831).
Ciconia argala, Temm. Pl. Col. 301.
From the Camma.

214. Scopus umbretta, Gmelin.
Scopus umbretta. Gm. Syst. Nat. i. p. 618.
Buff. Pl. Enl. 796.
From the Camma and formerly from the Muni.

215. Tantalus ibis, Linnæus.
Tantalus ibis, Linn. Syst. Nat. i. p. 241.
Tantalus rhodinopterus, Wagler, Syst. Av.
Buff. Pl. Enl. 389.
From the Camma.

216. Geronticus hagedash, (Latham.)
Tantalus hagedash, Lath. Ind. Orn. ii. p. 709.
Tantalus caffrensis, Licht.
Vieill. Gal. ii. pl. 246.
Numerous specimens from the Camma.

217 Geronticus olivaceus, (Du Bus.)
Ibis olivacea, Du Bus. Bull. Acad. Brussels, 1837, p. 103.
Du Bus. Esqu. Orn. i. pl. 3.
Several specimens from the Camma and formerly from the Moonda. The adult of this handsome species is described and figured very accurately by the Baron Du Bus, as above cited.
Young ♂. General colors as in the adult, but paler. Under parts of the body with large oval spots of dull yellowish.

218. Threskiornis religiosus, (Savigny).
Ibis religiosa, Savigny, Hist. Nat. d'Egypt.
Tantalus aethiopicus, Lath. Ind. Orn. ii. p. 706.
Numenius ibis, Cuvier, Ann. du Mus. iv. p. 116, pl. 53.
Numerous specimens precisely similar, so far as I can see, to others in the Acad. Mus. from Eastern and North Eastern Africa. From the Camma.

219. Numenius phaeopus, (Linnæus).
Scolopax phaeopus, Linn., Syst. Nat. i. p. 243.
Gould, B. of Eur. iv. pl. 303.
From the Camma.

220. Actitis hypoleucus, (Linnæus).
Tringa hypoleucos. Linn. Syst. Nat. i. p. 250.
Gould, B. of Eur. iv. pl. 316.
From the Camma.

221. Parra africana, Gmelin.
Parra africana, Gm. Syst. Nat. i. p.
Sw. Zool. Ill. pl. 43. Lath. Gm. Hist. ix. pl.
Numerous specimens from the Camma.
Young ♂. Head above and neck behind dark brown, upper parts of body dull rufous, under parts white. Breast tinged with dull yellow, sides and flanks dark chestnut, superciliary line dull ochre yellow.

222. Rallus oculeus, (Temminck).
Gallinula oculea, Temm.
Adult and young from the Camma.
Young ♂. Entire plumage dark brown with a reddish tinge on the under parts of the body. Quills black, with large spots of white, by which the species can easily be recognized.

223. Himantornis haematopus, Hartlaub.
"Himantornis haematopus, Temm." Hartl. Cab. Jour. iii. p. 357.
Two specimens only from the Camma.

[June,

224. PORPHYRIO ALLENI, Thomson.
Porphyrio Alleni, Thoms. Ann. and Mag. Nat. Hist. 1842, p. 204.
Gray, Gen. iii. pl. 162.
Numerous specimens from the Camma. Gray's beautiful plate above cited represents the adult of the size of life.
Young ♂. Upper parts dull greenish brown, feathers edged with dull yellowish, under parts dull yellowish white. Inferior wing coverts bluish, bill yellowish brown.

225. LIMNOCORAX FLAVIROSTRIS, (Swainson).
Rallus flavirostris, Swains.
Numerous specimens from the Camma.

226. PHOENICOPTERUS ERYTHRÆUS, Verreaux.
Phoenicopterus erythraeus, Verr. Rev. et Mag. 1855, p. 221.
One specimen only, which appears to be a young bird of this species.
From the Camma.

227. NETTAPUS MADAGASCARIENSIS, (Gmelin).
Anas madagascariensis, Gm. Syst. Nat. i. p. 522.
Anas aurita, Boddaert.
Buff. Pl. Enl. 770.
Specimens of both sexes, not to be distinguished from others in Acad. Mus. from Eastern Africa. From the Camma.

228. DENDROCYGNA VIDUATA, (Linnæus).
Anas viduata, Linn. Syst. Nat. i. p. 205.
Numerous specimens from the Camma and Ogobai.

229. QUERQUEDULA HARTLAUBII, nobis.
Querquedula cyanoptera, Hartl.
"Anas cyanoptera, Temm. Mus. Lugd."

The name by which this handsome species is given in Dr. Hartlaub's Ornithology of Western Africa, adopted from that of Temminck in the Leyden Museum, was long since anticipated by Vieillot in Nouv. Dict. v. p. 104. The species too, described by Vieillot as *Anas cyanoptera*, is a *Querquedula*, and the same as described and figured by me in Birds of California and Texas i. p. 82, pl. 15, and now well known as a bird of the Western regions of North America. I take the liberty, therefore, of applying to this bird the name of its first discriber, in which I hope to be sustained by naturalists, not only for reasons above mentioned, but as an act of justice to one who has contributed in the most important manner to Western African Ornithology.
This handsome bird is evidently an abundant species on the Camma and Ogobai. The sexes are very nearly alike.

230. PODICA SENEGALENSIS, (Vieillot.)
Heliornis senegalensis, Vieill. Nouv. Dict. xiv. p. 277.
Gray, Gen. iii. pl. 172.
From the Camma.

231. STERNA CASPIA, Pallas.
Sterna caspia, Pallas, Trans. Acad. St. Petersburg.
Gould, B. of Eur. pl. 414. Naumann, B. of Germ. pl. 248.
From the Camma.

232. STERNA CANTIACA, Gmelin.
Sterna cantiaca, Gm. Syst. Nat ii. p. 606.
Gould, B. of Eur. pl. 415. Naumann, B. of Germ. pl. 250.
From the Camma.

233. STERNA SENEGALENSIS, Swainson.
Sterna senegalensis, Swains. B. of W. Afr. ii. p. 250.
Nearly allied to the European *S. Hirundo*. From the Camma.

234. STERNA.
Several specimens of young birds impossible to identify, but apparently of one species only. Probably the young of a dark colored species.

235. RHYNCHOPS ORIENTALIS, Rüppell.
Rhynchops orientalis, Rüpp. Atlas, Birds p. 37, pl. 24.
Numerous specimens labelled as having been obtained on the Camma.

236. PLOTUS LEVAILLANTII, Temminck.
Plotus Levaillantii, Temm.
Plotus congensis, Cranch.
Buff. Pl. Enl. 107. Temm. Pl. Col. 380.
From the Camma. Precisely similar to specimens from Eastern and Southern Africa in the Academy Museum.

237. SULA CAPENSIS, Lichtenstein.
"Sula capensis, Licht." Bonap. Consp. Av. ii. p. 165.
"Sula melanura, Temm." Bonap. as above.
Easily to be distinguished from *S. bassana* by its black tail. Numerous specimens of adults and young from the Camma.

238. CARBO AFRICANUS, (Gmelin).
Pelecanus africanus, Gm. Syst. Nat. i. p. 177.
Carbo longicauda, Swains. B. of W. Afr. ii. p. 255, pl. 31.
One specimen only from the Camma.
With this species I conclude the catalogue of the present highly interesting collection.

An election for Librarian was held, and Dr. Jas. C. Fisher was duly elected.

July 5th.

MR. LEA, President, in the Chair.

Present thirty-seven members.

Mr. Lea presented the following, which was referred to a committee:

Description of four new species of Exotic Unionidæ.

Mr. Lea read letters which he had received from Dr. Lewis of Mohawk, New York, in which he mentions the astonishing number of dead shells of *Anodonta Lewisii*, Lea, in the canal, also the immense number of dead specimens of *Cyclas*, as they lie in beds from three to eight inches deep. He says he had taken two gallons of *living* specimens from an area of six by four feet. They do not burrow deeply in the mud, while the *Unio* goes down *two feet*. Mr. Lea compared this mass with the great deposit of fresh water gasteropods at Milk Pond, N. J. Dr. Lewis also collected specimens on the East Branch of the Unadilla, a small stream fourteen miles south west of Mohawk, and got about 200 *Anodonta Unadilla* DeKay=*An. edentula*, Say. Subsequently he visited Cedar Lake, a small body of water in Herkimer County, the south shores of which were composed of a greenish white marl, consisting of the remains of untold millions of shells. In the middle branch of the *Unadilla*, Dr. Lewis says, "I stopped just long enough to find one living specimen to be sure it was there. Dead shells were not rare, but I did not spend much time, only to learn the character of the stream, so as to be able to verify your opinion that *Anodonta Unadilla* was only a local variety of *An. edentula*, Say."

Mr. Lea also mentioned that he had received specimens in alcohol of *Unio Kleinianus*, Lea, from G. Hallenbeck Esq., of Columbus, Georgia, to which that ardent naturalist called his attention, as possessing a *branchial uterus in both lobes of the branchia on each side.* This very remarkable feature in the functions of the female of this species, constitutes the third which has been observed by Mr. Lea, two he had formerly shown to the Academy, namely, that of *Unio multiplicatus*, Lea, and *rubiginosus*, Lea.

July 12th.

Vice-President LE CONTE, in the Chair.

Present nineteen members.

Prof. Holmes exhibited a collection of fossils from the post-pliocene of South Carolina. He remarked:

If we examine the collection of remains of vertebrated animals taken from the post-pliocene or post-tertiary beds of South Carolina which I have the pleasure of exhibiting this evening to the members of the Academy, we will be surprised at the resemblance in many of the forms to corresponding parts of some of our domestic animals, as the horse, dog, hog, bull, etc., and the question may very naturally suggest itself—are the living horses, dogs, hogs, raccoons, opossums, deer, elk, tapirs, beavers, etc., and the one hundred and fifty species of mollusca now living on the coast, the descendants of the animals whose remains we find fossil in these beds,—or are these truly fossil remains, and not accidental occupants of this deposit?

My object is not to enter upon a discussion of these questions, but simply to exhibit the collection, and state the facts connected with their discovery, and the geological evidence of their being true fossils found in an extensive formation in the low country of South Carolina, included in a belt about ten miles wide, and occupying depressions in the great marl bed of the Eocene period.

Three distinct formations or beds are here supposed to belong to this post-pliocene age. First the marine beds, composed of a gray sandy clay in which are imbedded innumerable small shells, sometimes very comminuted, but of species now common and living on the coast; many of the large shells are

preserved in the position they occupied when living, having both valves entire and perfect, and presenting the appearance of having been destroyed suddenly by an avalanche of sand.

The second, is the blue or pluff-mud bed, composed of a stiff blue clay, containing silicious pebbles, and masses of conglomerates, water-worn and boulder-like, but no angular blocks, and also remains of marine and terrestrial animals. These pebbles and rolled conglomerates contain casts of the fossils common to the marl of the Eocene bed upon which the blue mud rests, and it has been ascertained that the silicious conglomerates are fragments of the marl, broken off, we infer, by the action of waves, and rolled upon the beach of a post-pliocene sea; they afterwards were imbedded in the blue mud, lost all their lime or calcareous particles, and became silicified.

The third or upper bed includes the peaty deposits, yellow sand and clays, which overlie the pluff-mud.

Sections of the three most important localities may be represented in the following diagrams:

Marine bed of the Wadmalarr.

Yellow Sand	15 feet.
Ferruginous sand with casts of shells	2 feet.
Red clay	2 feet.
Gray sand and mud with comminuted shells, fossils in fine preservation	3½ feet.

Ashley River beds.

Yellow sands with bands of Ferruginous clay	4 feet.
Blue mud resting on the white Eocene marl	1 foot.

Goose Creek beds.

Yellow sand	12 feet.
Blue mud	2 feet.
Ferruginous sand containing bones, etc	3 inches.
Yellow sand	3 feet.
Pliocene marl resting on the Eocene white marl	12 feet.

The fossil bones obtained from these strata are often in a fine state of preservation, especially those taken from the blue mud, which are generally petrified; those from the sands are likewise well preserved, but in the peaty or upper beds they are not so petrified, retain all their gelatine and appear to decompose rapidly. Most of the specimens in the collection now before you were some time ago submitted by me to your distinguished anatomist Professor Leidy, for determination. When they were returned I found a number labelled *recent*, which labels you will find still retained and attached to their respective specimens; at the same time the Professor wrote to say, "that they appeared to belong to recent species which had become accidental occupants of the same bed with the true fossils." I held the opposite opinion, and believed that they were true fossil remains, as I had myself collected them, not only from the banks and deltas of rivers, but a large number from excavations several feet below the surface, at a distance from any creek, pond or river, and in some cases from excavations below the high sandy land of cotton fields.

But a few weeks ago Dr. Klipstein, who resides near Charleston, in digging a ditch for the purpose of reclaiming a large swamp, discovered and sent me the tooth of a mastodon, one of the black specimens in the tray before you, with the request that I should go down and visit the place, as there were indications

of the bones and teeth of the animal still remaining in the sands which underlie the peat-bed. Accordingly, with a small party of gentlemen, we visited the Doctor, and succeeded not only in obtaining several other teeth and bones of this animal, but nearly one entire tusk, and immediately along side of the tusk discovered the fragment of *pottery* which I hold in my hand, and which is similar to that manufactured at the present time by the American Indians. The depth of the excavation was about three feet below the surface; bones of the deer and two teeth of a horse were also found.

This is not a drift-bed, but a deposite of the peat and sands of the post-pliocene formation. The marine beds with their characteristic shells lie immediately beneath, and is exposed on the high land which surrounds the swamp. If we take the one hundred and fifty species of mollusca, whose shells are so beautifully preserved in these beds, and place the entire group along side of a similar collection of the shells of the recent species living upon the coast, we will observe that they are identically the same in form, character and every other respect, except the following. There are among the fossils two shells whose analogues are not now living upon the sea coast of Carolina, but are common in the gulf of Mexico, and West Indian seas. *Strombus pugilis*, abundant on the coast of Florida and Cuba, is a fossil of the post-pliocene; and *Gnathodon cuneatum*, now living in the estuaries near Mobile, and along the northern coast of the Gulf is found fossil at a depth of eighteen or twenty feet under the city of Charleston, and in such numbers that cart-loads may be obtained from a single locality.

Again, we find two more species that are now extinct, or rather unknown to me in a recent state, one of which I have lately figured and described as *Cavolina Tuomeyii*, after my late friend and colleague Prof. Tuomey; the other is *Telledora lunulata*, Adams, a shell described as recent, from Carolina, but in fact a fossil in the post-pliocene and extinct.

Now let us compare this group of remains of the vertebrata with a similar group of living animals. Among the former we find teeth of the deer, raccoon, opossum and others well known to be living at the present time in South Carolina; but like the invertebrata we find two or three species which are no longer existing north of Mexico and South America—the *peccary*, the *capybara* and the *tapir*. Again, there are remains of the musk-rat and beaver, but these two animals are extinct in the low country of South Carolina; the beaver has indeed almost been extirpated to the east of the Mississippi river, and the musk-rat is confined to a region above the falls of the rivers of this State.

The mastodon, the megatherium, the mylodon and perhaps one or two others, are extinct.

That we may the better appreciate the interesting analogy existing between these two groups as regards the living and extinct species, we will place them in a tubular form, thus:

Fossil Remains.	Mollusca.	Vertebrata.
Species apparently the same as those now living and included in the fauna of South Carolina,	say 140	say 37
Species not included in the recent fauna of the State, but living within tropical latitudes,	say 2*	say 3‡
Do. do. in northern latitudes,	2†	3‖
Species presumed to be extinct,	say 2‡	say 5¶

* Strombus pugilis and Gnathodon cuneatum.
† Mya arenaria, Pandora trilineata.
‡ Cavolina Tuomeyi and Telledora lunulata.
‡ Tapir, Peccary and Capybara.
‖ Elk, Beaver, Musk-rat.
¶ Mastodon, Elephant, Megatherium, Mylodon, Castoroides.

The evidence which I propose to adduce for the correctness of my assertion that these are true fossils, will the better appear by the following extracts from a pamphlet issued a short time since, and which, in consequence of the great demand, has passed through two editions, and is now again out of print.

In a letter to Dr. Nott and Mr. Gliddon,* dated Feb. 10, 1857, Prof. Leidy writes:

"Some time since, Professor F. S. Holmes, of Charleston, submitted for my examination, a collection of fossil bones from a post-pliocene deposit on Ashley River, S. Carolina. Among remains of the extinct horse, the peccary, mylodon, megatherium, mastodon, hipparion, the tapir, the capybara, the beaver, the musk-rat, etc., were some which I considered as belonging to the dog, the domestic ox, the sheep and the hog. Prof. Holmes observes that these remains were taken from an extensive deposit, in which similar ones exist abundantly, and he further adds, that he cannot conceive that the latter should have become mingled with the former, since the introduction of domestic animals into America by Europeans. It is not improbable that the American continent once had, as part of its fauna, representatives of our domestic animals, which subsequently became extinct—though I am inclined to doubt it; but what we have learned of the extinct American horse, will lead me carefully to investigate the subject."

The opportunity for prosecuting this investigation, to some extent, I had the pleasure of affording Professor Leidy, in March last, a month after the date of the above letter. Dr. Hallowell and himself visited me in Charleston, and I accompanied them to Ashley ferry and Goose creek. The annexed extracts are from a paper of Professor Leidy's on this topic, written after his return home to Philadelphia, and he has also kindly sent me a number of very valuable drawings of fossil horse teeth, and other remains obtained from the Carolina beds †

"The interesting collection of remains of vetebrated animals, which form the subject of the following pages, for the most part have been submitted to the inspection of the author, by Prof. Holmes and Capt. A. H. Bowman, U. S. A., who collected them from the eocene, post-pliocene, and recent geological formations, in the vicinity of Charleston, South Carolina.

"The collections of these gentlemen consist of a most remarkable intermixture of remains of fishes, reptiles and mammals, of the three periods mentioned; and in many cases perhaps we may err in referring a particular species to a certain formation, more especially in the case of the fishes. The remains usually consist of teeth often well preserved, but frequently in small fragments, more or less water-worn, and most of the fossils are stained brown or black.

"By far the greater portion of the fossil remains are obtained from the post-pliocene deposit of the Ashley River, about ten miles from Charleston. The country in this locality is composed of a base of whitish eocene marl, containing remains of *squalodon—sharks and rays*—above which is a stratum of post-pliocene mud, about one foot in thickness, overlaid by about three feet of sand and earth mould.

"The post-pliocene mud contains great quantities of irregular, water-worn fragments of the eocene marl rock from beneath, mingled with sand, blackened pebbles, water rolled fragments of bones, and more perfect remains of fishes, reptiles and mammals, belonging to the post-pliocene and eocene fossils.

"On the shores of the Ashley River, where the post-pliocene and eocene formations are exposed, the fossils are washed from their beds, and become mingled with the remains of recent indigenous and domestic animals, and objects of human art, so that when a collection is made in this locality, it is sometimes difficult to determine whether the animal remains belong to the forma-

* Indigenous Races of the Earth; p. xix.

† Lithographs of these figures will appear in the volume, with Prof. L.'s paper.

tions mentioned or not. Generally, however, we have been able to ascertain where the fossils belong, which we have had the opportunity of examining, from the fact that the greater number were obtained from the deposits referred to in digging into them some distance from the Ashley River.

"The collections contain remains of the horse, ox, sheep, hog and dog, which I feel strongly persuaded, with the exception of many of those of the first mentioned animal, are of recent date, and have become mingled with the true fossils of the post-pliocene and eocene formations, where these have been exposed on the banks of the Ashley River and its tributaries. In regard to the remains of the horse, from the facts stated in the account given of them in the succeeding pages, I think it will be conceded that this animal inhabited the United States during the post-pliocene period, contemporarily with the *mastodon*, *megalonyx*, and the great broad fronted bison.

"Many of the mammalian remains are of recent animals, or at least are undistinguishable from the corresponding parts of the latter; and if they are not accidental occupants of the post-pliocene deposit, are highly interesting, as indicating their contemporaneous existence with many species and genera now extinct.*

"It appears to be quite well authenticated that the horse, which is now so extensively distributed, both in a wild and domestic condition, throughout North and South America, did not inhabit these continents at the time of their discovery by Europeans. With this fact in view, in conjunction with the circumstance that animal remains of late periods may become accidental occupants of earlier geological formations, we should require strong evidence to be advanced before it is admitted that the Horse belonged to an ancient fauna of the western world. At the present time the evidence appears to be sufficiently ample to justify the latter conclusion, and it is further sustained by the discovery, in the same part of the world, of the remains of two species of the closely allied genus *Hipparion*.

"Remains of the horse, discovered in Brazil, Buenos-Ayres, Chile, have been indicated by Dr. Lund, Prof. Owen, M. Weddell, and M. Gervais. These remains exhibit no well marked characters distinguishing them from corresponding portions of the skeleton of the recent horse, and from a comparison of the figures and descriptions which have been given of most of them, together with some remarks of the latter author, it is doubtful whether they belong to more than a single species, the *Equus neogæus* of Dr. Lund.

"Prof. Buckland and Sir John Richardson have described remains of the horse, discovered in association with those of the elephant, moose, reindeer, and musk-ox, in the ice cliffs of Eschscholtz Bay, Arctic America.

"In the United States, remains of the Horse, chiefly consisting of teeth, have been noticed by Drs. Mitchell,† Harlan,‡ and DeKay,§ but these gentlemen have neither given descriptions nor figures by which to identify the specimens. Some of the latter are stated to have been found in the vicinity of Neversink Hills, New Jersey; others in the excavation for the Chesapeake and Ohio Canal, near Georgetown, District of Columbia; and some in the latter tertiary deposit on the Neuse River, in the vicinity of Newbern, North Carolina. Dr. DeKay, in speaking of such remains, says, "they resemble those of the common horse, but from their size apparently belonged to a larger animal," and he refers them to a species with the name of *Equus major*.

"Dr. R. W. Gibbes‖ has given information of the discovery of teeth of the

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*Remains of the Tapir, Peccary and Capybara present a similar association of life to that now confined to South America.

†Catalogue of Organic Remains, 1826, 7, 8.

‡Med. and Phys. Researches, 1835, 267.

§Zoology, New York, pl. 1, Mammalia, 108.

‖Proc. Amer. Assoc., 1850, 66.

horse in the pliocene deposit of Darlington, South-Carolina; in Richland District of the same State; in Skidaway Island, Georgia, and on the banks of the Potomac river. He further observes that he obtained the tooth of a horse, from eocene marl, in the Ashley river, South Carolina, but the researches of Prof. Holmes* indubitably indicate the specimen to have been an accidental occupant of the formation.

"Specimens of isolated teeth, and a few bones of the horse, from the post-pliocene and recent deposits of this country, have frequently been submitted to my inspection. Many of these I have unhesitatingly pronounced to be relics of the domestic horse, though I feel persuaded that many remains of an extinct species are undistinguishable from the recent one.

"Whether more than one extinct species is indicated among the numerous specimens of teeth I have had the opportunity of examining, I have been unable satisfactorily to determine. The specimens present so much difference in condition of preservation, or change in structure; so much variation in size, from that of the more ordinary horse to the largest English dray horse; and such variableness in constitution, from that of the recent horse to the most complex condition belonging to any extinct species described, that it would be about as easy to indicate a half dozen species as it would two.

Under the circumstances, I would characterize the extinct horse of the United States as having had about the same size as the recent one, ranging from the more ordinary varieties to the English dray horse, with molar teeth, frequently comparatively simple in construction, but with a strong disposition to become complex.

"Among the number of teeth of the horse in Prof. Holmes' collection labelled as coming from the post-pliocene deposit of Ashley River, there are several, which, from their size, construction and condition of preservation, I feel convinced are of recent date: and these no doubt became mingled with the true fossils of that formation where it is exposed on the Ashley River, in which position I personally found undoubted remains of the recent horse and other domestic animals, and objects of human art, mingled with remains of fishes, reptiles, and mammals, washed by the river from the banks, composed of eocene and post-pliocene deposits.

"Teeth of an extinct species of horse, however, undoubtedly belong as true fossils to the post-pliocene formations in the vicinity of Charleston. These are usually hard in texture, stained brown or black from the infiltration of oxide of iron, sometimes well preserved, but more frequently in a fragmentary condition and water-worn. Generally they are not larger than the teeth of the more ordinary varieties of the domestic horse, and sometimes are quite as simple in the plication of their enamel, but usually are more complex and sometimes exceedingly so.

"Figure 1 represents a first superior molar tooth, neither larger nor more complex in structure than the corresponding tooth of the recent Horse. This specimen, which is dense and jet black in color, was obtained by Prof. Holmes from a stratum of ferruginous sand, two inches thick, exposed on the side of a bluff, on Goose Creek, about twelve miles from Charleston.

"Having expressed a desire to see the locality from which the tooth just mentioned was obtained, Prof. Holmes afforded me the opportunity of doing so. The bluff is about thirty feet high; its base is formed of a pliocene limestone, about fifteen feet thick, and composed of the debris of marine shells: above this is the stratum of ferruginous sand, of post-pliocene age, containing numerous pebbles and rolled fragments of bone all blackened like the tooth obtained from the same position. Overlying the latter stratum, there is a layer of stiff blue clay, about two feet in thickness, and above this there are about twelve feet of sand and earth-mould.

*Ibidem, 68.

"A similar blackened tooth was obtained from the same formation at Doctor's Swamp, John's Island.

"Figure 4 represents a very remarkably well preserved specimen of a lower molar above referred to from Georgia, where it was discovered by J. H. Couper, in association with equally well preserved remains of other extinct animals. The tooth is brown in color; and it neither differs in size nor form from its homologue in the recent horse.

"In the collection of fossils of Prof. Holmes, there is the specimen of an upper first large molar, labelled from Texas, represented in figure 5. The tooth is of the largest comparative size, and exhibits the highest degree of complexity in the folding of its enamel; in both of which characters it differs in such a remarkable degree from the corresponding tooth, represented in figure 5, from the post-pliocene formation of South Carolina, that it appears hardly possible that these two teeth should belong to the same species of horse.

"A remarkably well preserved specimen of an upper molar tooth, jet black in color, and an incisor, yellow and quite friable in texture, both belonging to the extinct horse, from North Carolina, have been submitted to my inspection by Prof. Emmons.

"Among the most interesting of the fossils discovered by Prof. Holmes, in the post-pliocene beds of the Ashley River, are two molar teeth of a species of the equine genus *Hippotherium*. These are the first remains of the latter discovered in America, and they indicate the smallest known species.

"Both specimens are from the upper jaw; and they are well characterized, not only by the isolation of the internal median enamel column, but also by the complex plication of the interior or central enamel columns.

"The larger specimen is firm in texture; has the enamel stained jet black, and the dentine and cement gray.

"I have personally had the opportunity of inspecting remains of the tapir, found in Texas, Louisiana, Kentucky, Mississippi, Indiana, Ohio and South Carolina, proving an extensive range of this animal at one time over the country of the United States.

"The specimens which were presented by Dr. Carpenter to the Academy of Natural Sciences of Philadelphia, on close comparison are not found to differ from the corresponding parts of the living *Tapirus americanus*.

"The post-pliocene deposit of the Ashley River contains a number of small fragments of molar teeth, and one nearly entire and unworn crown of a second lower molar, which have the same characters of form and size, as in the living tapir. Besides these, the same collections contain fragments of lower molars, and two nearly entire crowns of upper molars, having the exact form of the corresponding teeth of the *T. americanus*, but larger in size.

"Teeth of the beaver, jet black in color, have likewise been obtained from the post-pliocene deposit of Ashley River.

"The collections contain numerous specimens of blackened molar teeth, together with a few incisors and fragments of jaws, from the Ashley post-pliocene deposit, which neither differ in form nor size from the corresponding parts of the recent muskrat.

"Remains of *Lepus sylvaticus*—common gray rabbit—have been found in association with those of other rodents and of the extinct peccary near Galena, Illinois. A few specimens of molar teeth, black in color, apparently belonging to this species, were obtained from the post-pliocene beds of the Ashley River.

"Several small fragments of teeth of the *Megatherium*, in Prof. Holmes' collection, were obtained from the post-pliocene bed of the Ashley River. Previously to the discovery of those specimens, remains of the *Megatherium* had been found in no other locality of North America than in the State of Georgia.

"Two small fragments of lower molar teeth of *Mylodon Harlani* were obtained from the Ashley post-pliocene beds. One of the fragments is repre-

sented in figure 21, plate xvi. of 'A memoir on the extinct Sloth Tribe of North America,' by the author."

As regards the specimens of human art found as above, it must be remarked that it is only at this locality—Ashley Ferry—that we find such relics. Here at the base of a low bluff, is a beach of eocene marl; above the bluff is a farm-yard, and all the sweepings of the premises, consisting in part of old hoes, broken plough-shares, and fragments of crockery-ware, etc., are thrown into the river, and lie mingled with the fossils which are washed out of the bluff, and scattered over the surface of the beach below, which is exposed at low tide. At no other locality on this river, and there are several, viz.: Ramsay's, Clement's, Greer's, Middleton's, etc., where similar fossils are found, do we obtain relics of human art; at least, I have never found such.

The fossils from Ashley Ferry present, as a group, the same appearance as those procured inland at some distance from the river, by digging from three to five feet below the surface. Many specimens from the ferry were considered as recent by Professor Leidy; they appear quite fresh and unchanged in color, and their texture not in the slightest degree altered. To one familiar with the fossils of the South Carolina Post-Pliocene, this excites no surprise, as it is of common occurrence, more especially among the shells; for example, the olive shell—*Oliva literata*—is found as fresh and highly polished as the recent ones from the sea-beaches along the coast; and *Cardium magnum* retains often the delicate yellow and brown markings, common to the species.

The color or texture of a fossil, therefore, does not always absolutely determine its relative age; as Professor Leidy has himself remarked in a foot-note to his letter alluded to above, viz.:

"Fossilization, petrifaction, or lapidification, is no positive indication of the relative age of organic remains.

"The Cabinet of the Academy of Natural Sciences of Philadelphia contains bones of the megalonyx, and of the extinct peccary, that are entirely unchanged; not a particle of gelatin has been lost, nor a particle of mineral matter added, and, indeed, some of the bones of the former even have portions of articular cartilage and tendinous attachments, well preserved."*

From the foregoing it would appear that of the ancient fauna of America, which included representatives of many of our present domestic animals, some species have undoubtedly become extinct; but I confess I am not yet prepared to admit from any evidence yet adduced, or from my own examinations, that all of the living species are distinct from those found fossil in the post-pliocene. The teeth and bones of the rabbit, raccoon, opossum, deer, elk, hog, dog, sheep, ox and horse, are often found in these beds, and though associated with those known to be extinct, such as mastodon, megatherium, hipparion, etc., need not necessarily be referred to extinct races also; since their remains cannot be distinguished from the bones and teeth of the living species.

It has been just remarked that about ninety-five per cent., or nearly all of the one hundred and fifty shells of molluscous animals from these beds are specifically identical with the recent or living species of the coast,—two are found only at the south of this, and two are extinct. Of the vertebrates from the same bed, the tapir, peccary, raccoon, opossum, deer, musk-rat, rabbit, beaver, and elk have still their living representatives, generically, if not specifically; and even of the identity of species there seems to be no doubt, as no anatomical differences can be discerned. Two of these species, like the mollusca just alluded to, no longer live in South Carolina; the tapir and peccary are only found in South America and Mexico; the musk-rat, elk and beaver, though extinct on the Atlantic coast, are still living in the interior of the country. And though it has been acknowledged that the mastodon, megatherium, elephant, glyptodon, and two species of Equine genera, etc., are entirely extinct, yet the

* Indigenous Races of the Earth, p. xix.

discoveries made of the remains even of some of these, would indicate that they still existed at a period so recent, that, in the language of Professor Leidy, "it is probable the red man witnessed their declining existence."

The peccary, or Mexican hog, an animal common in Mexico, is not indigenous to the Atlantic United States; but his bones have been found associated with human remains in caves used as cemeteries by the Aborigines.* "A tomb in the city of Mexico," according to Clavigero, (?)† "was found to contain the bones of an entire mammoth, the sepulchre appearing to have been formed expressly for their reception." And "Mr. Latrobe relates that during the prosecution of some excavations, near the city of Tezcuco, one of the ancient roads or causeways was discovered, and on one side, only three feet below the surface, in what may have been the ditch of the road, there lay the entire skeleton of a mastodon. It bore every appearance of having been coeval with the period when the road was used."

Again I extract from Prof. Leidy's letter:‡

"The early existence of the genera to which our domestic animals belong, has been adduced as presumptive evidence of the advent of man at a more remote period than is usually assigned. It must be remembered, however, even at the present time, that of some of these genera only a few species are domesticated: thus of the existing six species of *Equus* (Horse) only two have ever been freely brought under the dominion of man.

"The horse did not exist in America at the time of its discovery by Europeans; but its remains, consisting chiefly of molar teeth, have now been so frequently found in association with those of extinct animals, that it is generally admitted once to have been an aboriginal inhabitant. When I first saw examples of these remains I was not disposed to view them as relics of an extinct species; for although some presented characteristic differences from those of previously known species, others were undistinguishable from the corresponding parts of the domestic horse, and among them were intermediate varieties of form and size. The subsequent discovery of the remains of two species of the closely allied extinct genus Hipparion, in addition to the discovery of remains of two extinct equine genera of an earlier geological period, leaves no room to doubt the former existence of the horse on the American continent, contemporaneously with the Mastodon and Megalonyx: and man probably was his companion."

The result of the whole seems to be, that of the animals found fossil in the post-pliocene beds, all the mollusca of the present day are undoubtedly a perpetuation of the same species; that of the higher order of vertebrata, the tapir, peccary, raccoon, opossum, deer, elk, and musk-rat are equally entitled to be considered the descendants of this ancient race. And if the claims of the mollusca to this distinction rest upon a secure basis, because they are peculiar to this country, and not obnoxious to suspicion of foreign immigration, it must be recollected that this is equally true of the above named animals.

Those which have hitherto been regarded as of recent and European origin, are the horse, sheep, hog, and ox; and it must be reserved perhaps for future consideration to determine how far the negative proof of the non-existence of these animals in the country at the time of its discovery may be regarded in each individual case sufficiently strong to settle the question of his extinction and reintroduction, when so many of his associates and contemporaries have succeeded in maintaining an unbroken line of descent down to the present day.

Professor Agassiz's Letter.

KEY WEST, Feb. 25th, 1858.

Professor F. S. Holmes:

MY DEAR SIR:—I have not forgotten my promise to write to you my impressions respecting your important discoveries of fossil mammalia in the post-

* Bradford's American Antiquities, p. 31.
† Bradford's American Antiquities, p. 227.
‡ Nott and Gliddon, Indigenous Races of the Earth, p. xviii.

pliocene beds of South Carolina. Indeed I have been thinking of them continually since I saw them, and nothing impressed me so deeply for many years past as the sight of these bones. I consider their careful study in all their relations as of the utmost importance for the progress of our science. It is true there is hardly anything of interest in the animals themselves, since they appear to be all well known types, but their simultaneous occurrence in the same beds, showing that they have lived together at a time when the white man had not yet planted himself upon this continent, render their association as undisputed. How does it happen, that horses, sheep, bulls and hogs, not distinguishable from our domestic species, existed upon this continent, together with the deer, the musk-rat, the beaver, the hare, the opossum, the tapir, which in our days are peculiar to this continent, and not found in the countries where our domesticated animals originated? The whole matter might seem to admit of an easy solution by supposing that the native American horse, sheep, bull, and hog were different species from those of the old world, even though the parts preserved show no specific differences; but this would be a mere theoretical solution of a difficulty which seems to me to have far deeper meaning, and to bear directly upon the question of the first origin of organized beings.

The circumstances under which these remains are found, admit of no doubt, but the animals from which they are derived, existed in North America long before this continent was settled by the white race of men, together with animals which to this day are common in the same localities, such as the deer, the musk-rat, the opossum and others only now found in South America, such as the tapir. This shows beyond the possibility of a controversy, that animals which cannot be distinguished from one another, may originate independently in different fauna, and I take it that the facts you have brought together are a satisfactory proof that horses, sheep, bulls and hogs, not distinguishable at present from the domesticated species, were called into existence upon the continent of North America prior to the coming of the white race to these parts, and that they had already disappeared here when the new comers set foot upon this continent; but the presence of tapir teeth among the rest show also that a genus peculiar to South America and the Sunda Islands existed also in North America in those days, and that its representative of that period is not distinguishable from the South American species.

It would be desirable in this stage of the enquiry to compare your tapir teeth with those of the species from Central America, which is considered distinct from the Brazilian species. This circumstance leads naturally to the question of the specific identity of all these animals with those now living in the same locality, and with the domesticated species. And here I confess the difficulty to be almost insuperable, or at least hardly approachable in the present state of our science, when the views of naturalists are so divided as to what are species among the genera bos, ovis, capra. For myself, I entertain doubt respecting the unity of origin of the domesticated horses. But whatever be the final result of this enquiry, this much is already established by the fossils you have collected, that horses, hogs, bulls and sheep were among the native animals of North America, as early as the common American deer, the opossum, the beaver, the musk-rat, etc. What remains to be settled respecting their specific identity is involved in the controversy now carried on between naturalists, who admit specific distinctions upon a very wide range of differences, and those who limit them within narrow boundaries. But the final solution of this point can in no way lessen the interest of your discoveries.

Should you publish anything upon this subject, let me have your notice, for I am deeply interested in the subject, as I always shall be, in everything you do.

Ever truly your friend,

L. AGASSIZ.

July 19*th.*

Major LE CONTE, Vice-President, in the Chair.

Present nineteen members.

The following were presented for publication in the Proceedings:—

"Notes on American Land Shells, No. 5, by W. G. Binney." "Catalogue of Birds collected in the vicinity of Fort Tejon, California, with a description of a new species of Syrnium, by John Xantus."

And were referred to committees.

July 26*th.*

Major LE CONTE, Vice-President, in the Chair.

Present thirteen members.

The committees to which the following papers were referred reported in favor of publication in the Proceedings:

Descriptions of Four New Species of Exotic UNIONIDÆ.

BY ISAAC LEA.

UNIO BULLOIDES.—Testâ sulcatâ, subrotundâ, valdè ventricosâ, subæquilaterali, posticè subalatâ, anticè rotundatâ; valvulis subtenuibus; natibus prominentibus, tumidis, ad apices radiis elevatis divaricatis; epidermide luteo-fuscâ, crebris transversis sulcis, eradiatâ; dentibus cardinalibus prælongis, lamellatis, valdè obliquis; lateralibus sublongis, lamellatis subrectisque; margaritâ albâ et iridescente.

Hab.—Rio de la Plata. South America. G. Von dem Busch, M. D.

MONOCONDYLŒA PLANULATA.—Testâ alatâ, lævi, obovatâ, valdè compressâ, ad laterè planulatâ, valdè inæquilatèrali, posticè obtusè angulatâ, anticè rotundâ; valvulis tenuissimis, pellucidis; natibus vix prominentibus; epidermide minutissimè striatâ, luteolâ, posticè viridi, subnitidâ, obsoletè radiatâ; dentibus cardinalibus parvissimis, compresso-tuberculatis, in utroque valvulo singulis; margaritâ cæruleo-albâ et iridiscente.

Hab.—Java. G. Von dem Busch, M. D.

MONOCONDYLŒA RHOMBOIDEA.—Testâ lævi, rhombo-quadratâ, valdè compressâ, ad laterè planulatâ, valdè inæquilaterali, posticè subalatâ, anticè obliquè truncatâ; valvulis tenuibus; natibus vix prominentibus, ad apices crebrissimè et minutè undulatâ: epidermide olivaceâ, striatâ, nitidâ, obsoletè radiatâ; dentibus cardinalibus parvis, compresso-tuberculatis, in utroque valvulo singulis; margaritâ vel aureâ vel purpurascente et valdè iridescente.

Hab.—Euphrates River, near Bagdad, Asia. G. Von dem Busch, M. D.

UNIO RUDUS.—Testâ lævi, ellipticâ, crassâ, inflatâ, inæquilaterali, posticè emarginatâ, anticè obliquè rotundatâ; valvulis valdè crassis, anticè crassioribus; natibus crassis prominentibusque; epidermide tenebroso-fuscâ, asperè striatâ, radiis uncisis; dentibus cardinalibus parviusculis, sublongis, striatis, crenulatis, in utroquè valvulo duplicibus; lateralibus sublongis, subcrassis, granulatis curvisque, margaritâ albâ et paulisper iridescente.

Hab.—Rio de la Plata, South America. G. Von dem Busch, M. D.

Notes on American Land Shells, No. 5.

BY W. G. BINNEY.

In the Catalogue of American Land Shells, published in the last volume of the Proceedings, a few species were accidentally omitted. These and some additional authorities are given below. Several newly detected species are also given.

1. A. foliolatus non *foliatus*.

12. H. Californiensis *Lea, Trosch., DeK., Binn.*—nec *Chemn., Rve.*

13*a*. H. c u l t e l l a t a *Thomson.*

33*a*. H. s t r i g o s a *Gld., Binn., Pfr.*

33*b*. H. T o w n s e n d i a n a *Lea, Binn., DeK., Tros., Pfr., Gld., Chemn., Rve.*

33*c*. H. t u d i c u l a t a *Binn., Pfr.*

33*d*. H. V a n c o u v e r e n s i s *Lea, Tros., DeK., Pfr., Binn., Chemn., Gld., Rve.*
H. concava Binn. olim.
H. vellicata Forbes, Chemn., Rve., Pfr.

41. B. s u f f l a t u s *Gld.* in litt.
B. vesicalis Gld. olim.

48*a*. (in addenda) is syn. of 48.

49*a*. T. bilineatus *Cart.* (*Grat.*)
sp. mihi ignota.

55*a*. L. lineatus *DeK.*
sp. ined.—mihi ignota.
Limax—sp. excl..
Limax gracilis Grat.
Eumelus lividus Grat.
" *nebulosus* Grat.
Philomycus dele *lividus.*
" " *nebulosus.*
" adde.
P. oxyrus Raf., Gr. et Pf.
P. quadrilus Raf., Gr. et Pfr.
dele
Oxyrus
" *quadrilus.*

58. adde *V. Americana* Chemn.

68. *S. Texasiana* Pfr., Chem.

69. S. obiqua Pfr.

82. *H. auriculata* DeK.

83. *Stenotrema avara* Hart.

84*a*. H. B e r l a n d e r i a n a *Mor., Desh. in Lam., Chemn., Pfr. in* vol. iii. *nec* vol. i., *Rve., Binn.*
H. pachyloma Mke., Pfr. ?
H. virginalis Pfr., Chemn.?

86. H. bulbina Pfr.

86*a*. H. c a d u c a *Pfr., Chemn., Rve.*

97. H. dentifera *Pfr.* vol. i. *nec* vol. iii., *nec Chemn.*
After *H. diodonta* Say, read *H. dissidens* Desh. = H. concava.

104. *H. Tennesseensis* Tros.

130. *H. Mobiliana* Tros.
After 132 read *H. Leaii* Ward = H. monodon.

133. H. lævigata *Desh.*

139*a*. H. m a x i l l a t a *Gld., Pfr.*

140*a*. H. m i l i u m *Morse.*

141. *H. apex* Ad.

144. dele *H. monoden* var. γ. Pf.—legge *H. convexa* var. γ. Pfr.

158. *H. dentifera* Pf. in vol. iii. nec. vol. i., Chemn., nec. Binn.
After 161 *H. septemvolva* Say, &c. =H. cereolus Muhl.

170. *H. Tamaulipasensis* Lea.

172. *H. thyroidus* Desh. in Fer.

176. *dele* H. varians Rve.

187*a*. B. G o s s e i *Pfr.*, (*Röemer.*)

192*a*. B. p a t r i a r c h a W. G. Binn.

193. Adde *Rve.*

195. *B. kortensis* Ad.!

213. *P. maritima* Gld., (nec γ.)

214*a*. P. p e l l u c i d a *Pfr., Chemn.*

217. *P. rupicola* Chemn.

218. *Vertigo variolosa* Ad. Gen.
E Heliceis exclusa.
Triodopsis lunula Raf.

229*a*. M. f l a v u s *Gmel., Pfr.*
Auricula Midæ &c. Mart. and Chemn.
Voluta Schr.
" *flava* Gmel., Dillw.
" *flammea* γ. Gmel.
Bulimus monile Brug.
Melampa monile Schw.
Conovulus monile Goldf.
" *flavus* Anton.

Auricula monile Fer., Lam., Chem.
" *flava* Desh. in Lam.
" *coniformis* Orb.
Melampus monile Lowe.
Melampus torosa Möroh.
" *monilis* Shuttl.
232*a*. M. Redfieldi Pfr.
245. *H. vestita* Pfr.

Catalogue of Birds collected in the vicinity of Fort Tejon, California, with a description of a new species of SYRNIUM.

BY JOHN XANTUS.

The following list presents the results of ornithological collections made in the vicinity of Fort Tejon, in California, during a period embraced between the end of May, 1857, and the beginning of November, 1858, about 17 months, and including but one season of northward migration of the species. The 144 species enumerated are not to be considered as all that belong to the region above mentioned, as many birds are so rare, retiring, or difficult of approach, that they can only be secured in a series of years. Many additional species of rapacious and water birds were seen but could not be obtained, and though many of these were readily recognized, I have not felt at liberty to mention them in the list, which consists entirely of species actually collected within a few miles of the Post, and now in the Museum of the Smithsonian Institution. Of all the species collected, or observed, copious notes were taken relating to the numbers, dimensions, habits, reproduction, &c. These will all be made the subject of a special memoir hereafter, and I limit myself here to a simple enumeration of species.

It will be seen from the catalogue that the Fauna of Fort Tejon is essentially that of the coast of California, as shown by the abundance of the California Jay, Brown Pipilo, &c., *Psaltriparus minimus*, etc., and has only slight relations to that of the interior or Colorado region.

Some of the most interesting results of the collections made at Fort Tejon, consist in the addition to science of several new species, as *Syrnium occidentale*, *Empidonax Hammondii*, *Vireo Cassinii*, etc., and in the increase of the Fauna of the United Srates by some Mexican species, as *Selasphorus calliope*, *Dendrocygna fulva*, &c.; *Helminthophaga ruficapilla* had not previously been found west of the Rocky Mountains, while *Carpodacus Cassinii* was for the first time obtained west of the Colorado river.

It may be proper to state that Fort Tejon is a U. S. Military post, situated near the Tejon Pass, at the head of the Tulare Valley, between the cascade and coast mountain ranges of California, in about latitude 35° north, longitude 119° west. The height of the Post is about 4250 feet above the sea, and this altitude with the proximity of higher mountains, gives to it a peculiar Fauna, in many respects quite different from that of the low lands of the same parallel.

It is an interesting fact, that while the Bighorn, (*Ovis montana*,) and the Missouri black-tailed or mule deer, (*Cervus macrotis*,) are abundant in the vicinity, the common black-tailed deer of California (*Cervus columbianus*) is seldom, if ever, met with.

A comparison of the present list with that published by Dr. T. C. Henry, U. S. A., of the species inhabiting the vicinity of Fort Thorn, in the upper Rio Grande, and in the Rocky Mountain district, will be of particular interest, as illustrating the differences in the character of the two regions. Dr. Henry's long residence at or near the post above mentioned, enabled him to exhaust the ornithology of the country more fully than I could do, in a much less time, his list reaching 198 species, while mine embraces only 144. It is, however, quite probable that the number of Fort Tejon birds could not readily be brought up much above 200 species, as the great elevation of the Post would make it little liable to the visits of many water birds, or of the land birds requiring a hot climate and low country.

The names and numbers (on the left-hand side) given, are those of the species in the Report on birds of the Pacific R. R. Survey, Vol. ix.

List of Species collected.

1. CATHARTES AURA, Illig.—Turkey Buzzard.
13. TINNUNCULUS SPARVERIUS, Vieill.—Sparrow Hawk.
16. ACCIPITER MEXICANUS, Swains.—Blue-backed Hawk.
17. ACCIPITER FUSCUS, Bonap.—Sharp-shinned Hawk.
24. BUTEO MONTANUS, Nuttall.—Western Red-tail.
26. BUTEO ELEGANS, Cassin.—Red-bellied Hawk.
32. ARCHIBUTEO FERRUGINEUS, Gray.—Squirrel Hawk.
38. CIRCUS HUDSONIUS, Vieillot.—Marsh Hawk.
47. STRIX PRATINCOLA, Bonap.—Barn Owl.
48. BUBO VIRGINIANUS, Bonap.—Great Horned Owl.
54*a*. SYRNIUM OCCIDENTALE, Xantus.—California Barred Owl.
57. NYCTALE ACADICA, Bon.—Saw-whet Owl.
59. ATHENE CUNICULARIA, Bon.—Burrowing Owl.
51. OWL, (too young to identify).
68. GEOCOCCYX CALIFORNIANUS, Baird.—Paisano; Chapparal Cock.
75. PICUS HARRISII, Aud.—Harris' Woodpecker.
77. PICUS GAIRDNERI, Aud.—Gairdner's Woodpecker.
78. PICUS NUTTALLI, Gambel.—Nuttall's Woodpecker.
87. SPHYROPICUS RUBER, Baird.—Red-breasted Woodpecker.
95. MELANERPES FORMICIVORUS, Bonap.—California Woodpecker.
96. MELANERPES TORQUATUS, Bonap.—Lewis's Woodpecker.
98. COPATES MEXICANUS, Swains.—Red-shafted Flicker.
102. TROCHILUS ALEXANDRI, Bourc. and Muls.—Black-chinned Humming Bird.
103. SELASPHORUS RUFUS, Sw.—Rufous Humming Bird.
104. SELASPHORUS CALLIOPE, Gould.
105. ATTHIS ANNA, Reichenb.—Anna Humming Bird.
106. ATTHIS COSTÆ, Reichenb.—Ruffed Humming Bird.
126. TYRANNUS VERTICALIS, Say.—Arkansas Flycatcher.
131. MYIARCHUS MEXICANUS, Baird.—Ash-throated Flycatcher.
134. SAYORNIS NIGRICANS, Bonap.—Black Flycatcher.
137. CONTOPUS BOREALIS, Baird.—Olive-sided Flycatcher.
138. CONTOPUS RICHARDSONII, Baird.—Short-legged Pewee.
141. EMPIDONAX PUSILLUS, Cab.—Little Flycatcher.
144*a*. EMPIDONAX DIFFICILIS, Baird.—Western Flycatcher.
145. EMPIDONAX HAMMONDII, Baird.—Hammond's Flycatcher.
150. TURDUS NANUS, Aud.—Dwarf Thrush.
155. TURDUS MIGRATORIUS, Linn.—Robin.
156. TURDUS NÆVIUS, Gmelin.—Varied Thrush.
159. SIALIA MEXICANA, Swains.—Western Blue Bird.
161. REGULUS CALENDULA, Licht.—Ruby-crowned Wren.
164. HYDROBATA MEXICANA, Baird.—Water Ouzel.
165. ANTHUS LUDOVICIANUS, Licht.—Tit-lark.

170. GEOTHYLPIS TRICHAS, Cab.—Maryland Yellow Throat.
173. GEOTHLYPIS MACGILLIVRAYI, Baird.—Macgillivray's Warbler.
177. ICTERIA LONGICAUDA, Lawr.—Long-tailed Chat.
183. HELMINTHOPHAGA RUFICAPILLA, Bd.—Nashville Warbler.
184. HELMINTHOPAGA CELATA, Baird.—Orange-crowned Warbler.
192. DENDROICA NIGRESCENS, Baird.—Black-throated Gray Warbler.
195. DENDROICA AUDUBONII, Baird.—Audubon's Warbler.
203. DENDROICA ÆSTIVA, Baird.—Yellow Warbler.
213. MYIODIOCTES PUSILLUS, Bonap.—Green Black-cap Flycatcher.
223. PYRANGA LUDOVICIANA, Bonap.—Louisiana Tanager.
226. HIRUNDO LUNIFRONS, Say.—Cliff Swallow.
227. HIRUNDO BICOLOR, Vieill.—White-bellied Swallow.
228. HIRUNDO THALASSINA, Sw.—Violet Green Swallow.
231. PROGNE PURPUREA, Boie.—Purple Martin.
234. PHAINOPEPLA NITENS, Sclater.—Black-crested Flycatcher.
235. MYIADESTES TOWNSENDII, Cab.—Townsend's Flycatcher.
238. COLLYRIO EXCUBITOROIDES, Baird.—White-rumped Shrike.
245. VIREO GILVUS, Bonap.—Warbling Flycatcher.
250. VIREO SOLITARIUS, Vieill.—Blue-headed Flycatcher.
251. VIREO CASSINII, Xantus.—Cassin's Vireo.
253*a*. Var. MIMUS CAUDATUS, Baird.—Long-tailed Mocker.
256. HARPORHYNCHUS REDIVIVUS, Cab.—California Thrush.
263. CATHERPES MEXICANUS, Baird.—White-throated Wren.
264. SALPINCTES OBSOLETUS, Cab.—Rock Wren.
267. THRYOTHORUS BEWICKII, Bonap.—Bewick's Wren.
268. CISTOTHORUS PALUSTRIS, Cab.—Long-billed Marsh Wren.
271. TROGLODYTES PARKMANNI, Aud.—Parkman's Wren.
273. TROGLODYTES HYEMALIS, Vieill.—Winter Wren.
274. CHAMÆA FASCIATA, Gambel.—Ground Tit.
276. CERTHIA MEXICANA, Gloger.—Mexican Creeper.
278. SITTA ACULEATA, Cassin.—Slender-billed Nutatch.
282. POLIOPTILA CÆRULEA, Sclat.—Blue-gray Gnatcatcher.
287. LOPHOPHANES INORNATUS, Cassin.—Gray Titmouse.
294. PARUS MONTANUS, Gambel.—Mountain Titmouse.
298. PSALTRIPARUS MINIMUS, Bonap.—Least Tit.
362. EREMOPHILA CORNUTA, Boie.—Sky Lark.
306. CARPODACUS CALIFORNICUS, Baird.—Western Purple Finch.
307. CARPODACUS CASSINII, Baird.—Cassin's Purple Finch.
308. CARPODACUS FRONTALIS, Gray.—House Finch.
314. CHRYSOMITRIS PSALTRIA, Bonap.—Arkansas Finch.
316. CHRYSOMITRIS LAWRENCII, Bonap.—Lawrence's Goldfinch
317. CHRYSOMITRIS PINUS, Bonap.—Pine Finch.
335. PASSERCULUS ALAUDINUS, Bonap.—Lark Sparrow.
344. CHONDESTES GRAMMACA, Bonap.—Lark Finch.
346. ZONOTRICHIA GAMBELII, Gambel.—Gambel's Finch.
347. ZONOTRICHIA CORONATA, Baird.—Golden-crowned Sparro

352. Junco Oregonus, Sclat.—Oregon Snow Bird.
359. Spizella socialis, Bonap.—Chipping Sparrow.
364. Melospiza Heermanni, Baird.—Heermann's Song Sparrow.
366. Melospiza rufina, Baird.—Rusty Song Sparrow.
367. Melospiza fallax, Baird.—Mountain Song Sparrow.
368. Melospiza Lincolnii, Baird.—Lincoln's Finch.
372. Peucæa ruficeps, Baird.—Brown-headed Finch.
375. Passerella Townsendii, Nutt.—Oregon Finch.
376. Passerella schistacea, Baird.—Slate-colored Sparrow.
381. Guiraca melanocephala, Sw.—Black-headed Grosbeak.
382. Guiraca cærulea, Sw.—Blue Grosbeak.
386. Cyanospiza amœna, Baird.—Lazuli Finch.
394. Pipilo megalonyx, Baird.—Spurred Towhee.
396. Pipilo fuscus, Sw.—Brown Towhee.
401. Agelaius phœniceus, Vieill.?—Red-winged Blackbird.
403. Agelaius tricolor, Bonaparte.—Red and White-shouldered Blackbird.
404. Xanthocephalus icterocephalus.—Yellow-headed Blackbird.
407. Sturnella neglecta, Aud.—Western Lark.
416. Icterus Bullockii, Bonap.—Bullock's Oriole.
418. Scolecophagus cyanocephalus.—Brewer's Blackbird.
423. Corvus carnivorus, Bartram.—American Raven.
430. Picicorvus Columbianus, Bonap.—Clark's Crow.
435. Cyanura Stelleri, Sw.—Steller's Jay.
437. Cyanocitta Californica, Strick.—California Jay.
445. Columba fasciata, Say.—Band-tailed Pigeon.
451. Zenaidura Carolinensis, Bonap.—Common Dove.
473. Oreortyx pictus, Baird.—Mountain Quail.
474. Lophortyx Californicus, Bonap —California Quail.
485. Garzetta candidissima, Bonap.—Snowy Heron.
486*a*. Herodias egretta, v. Californica.—California Egret.
493. Butorides virescens, Bonap.—Green Heron.
495. Nyctiardea gardeni, Baird.—Night Heron.
500. Ibis ordii, Bonaparte.—Glossy Ibis.
504. Ægialitis vociferus, Cassin.—Killdeer.
517. Recurvirostra Americana, Gm.—American Avoset.
518. Himantopus nigricollis, Vieillot.—Black-necked Stilt.
523. Gallinago Wilsonii, Bonap.—English Snipe.
525. Macrorhamphus scolopaceus, La.—Greater Longbeak.
532. Tringa Wilsonii, Nuttall.—Least Sandpiper.
535. Ereunetes petrificatus, Ill.—Semipalmated Sandpiper.
539. Gambetta melanoleuca, Bonap.—Tell-tale; Stone Snipe.
543. Tringoides macularius, Gray.—Spotted Sandpiper.
554. Rallus Virginianus, Linn.—Virginia Rail.
559. Fulica Americana, Gmelin.—Coot.
575. Dendrocygna fulva, Burm.—Brown Tree-duck.
576. Anas Boschas, Linn.—Mallard.

[July,

578. DAFILA ACUTA, Jenyns.—Sprig-tail; Pin-tail.

579. NETTION CAROLINENSIS, Baird.—Green-winged Teal.

582. QUERQUEDULA CYANOPTERUS, Cassin.—Red-breasted Teal.

583. SPATULA CLYPEATA, Boie.—Shoveller.

585. MARECA AMERICANA, Stephens.—Baldpate.

591. AYTHYA AMERICANA, Bonap.—Red-head.

595. BUCEPHALA ALBEOLA, Baird.—Butter Ball.

609. ERISMATURA RUBIDA, Bonap.—Ruddy-Duck.

663. LARUS CALIFORNICUS, Lawr.—California Gull.

698. COLYMBUS TORQUATUS, Brünn.—Loon.

SYRNIUM OCCIDENTALE, Xantus.

Sp. Char. A little smaller than *S. nebulosum*; general color liver brown, the feathers barred everywhere, even on the flanks. Axillars and under wing and tail coverts banded transversely with white, the bands towards and on the head are contracted into rounded spots.

General appearance that of *S. nebulosum*. Prevailing color light liver brown, each short feather with two transverse bars of white, the basal one tinged with rufous yellow; the subterminal pure white and not generally extending to the edges of the feathers. These bars have a marginal suffusion of brown darker than the ground color. On the top of the head and neck the subterminal bar exhibits a tendency to contraction into rounded or cordate spots, and in other places to a median interruption along the shaft. On the scapulars, axillars and other elongated feathers, there are several white bars. The facial disk is grayish, obscurely barred with brown, the posterior margin of the ear is uniform liver brown, then becoming banded with white. The longest quills and tail feathers show about 7 to 9 clouded transverse light bars, one of these at the end of the feather; those bars on the inner and outer margins are quite white, especially towards the base of the feather, elsewhere they are mottled yellowish brown, or brownish yellow; the legs are dirty yellowish, with obscure and rather transverse mottlings of brown. The bill is greenish yellow; the iris gamboge: the claws horn color; the toes are thickly feathered to within two scutellæ of the base of the claws. The fourth quill is longest, the fifth and then the third a little shorter, the second between the 6th and 7th; the first rather shorter than the eighth.

Length of male 18 inches; extent 40; wing 13; tail 8½; tarsus about 2.

This species, with a general resemblance to the *Syrnium nebulosum*, is of rather smaller size, and readily distinguished by the entire absence of any of the longitudinal brown stripes so conspicuous on the belly, flanks and lower tail coverts of the latter species; these regions being barred transversely with white and brown. The white bars on the feathers are much less continuous and regular, and on the neck and head are restricted to rounded spots instead of forming regular zones. The under wing coverts are banded transversely instead of being uniform yellowish white. The bill is less pure yellow.

A single specimen (original number 1588) was collected at Fort Tejon, March 6th, 1858.

August 2d.

Major LE CONTE, Vice President, in the Chair.

Present seventeen members.

Dr. Hammond read a letter from Miss M. H. Morris of Germantown, giving an account of a luminous larva, two inches long, which was found in a forest, at the Delaware Water Gap. Miss M. observes, "the whole length of the

under part of the body, the intervals of the segments, the prolegs and spiracles, shine with a pale green light. The insect, which is now kept in a box with decaying wood and earth, has penetrated into the latter, and appears to be ready to assume the pupa form." Should it undergo its perfect metamorphosis, Miss M. promises to give the Academy a further account of the insect.

August 16*th*.

Major LE CONTE, Vice President, in the Chair.

Present eighteen members.

A paper was presented for publication in the Proceedings entitled "New Genera and Species of North American Tipulidæ with short palpi, with an attempt at a new classification of the tribe, by R. Osten Sacken;" and also the following:

"Description of a type of Gobioids, intermediate between Solinæ and Tridentigerinæ. By Theodore Gill."

"Description of a new South American type of Siluroids allied to Callophysus. By Theodore Gill." Which were referred to Committees.

August 23*d*.

Mr. LEA, President, in the Chair.

Present twenty-five members.

Dr. Leidy read a letter from Dr. G. J. Fisher, dated at Sing Sing, New York, giving an account of an antler of the Reindeer, which had been found in the vicinity of the place mentioned. The specimen was discovered in excavating a peat bed, at the depth of six feet from the surface. The peat bed is almost an acre in extent, surrounded by high ground, and looks as if it had been the site of an ancient lake. Dr. L. observed that there is a similar specimen of an antler of the Reindeer in the museum of the Academy, which had been found near Vincentown, New Jersey, at the depth of four feet. See Proc. 1858, 179. The discovery of these remains of the Reindeer, and likewise of the remains of the Walrus, in similar positions in New Jersey, (See Trans. Am. Phil. Soc. xi. 83,) favor the view that the arctic fauna at one period extended its boundary much more southerly than at present.

Dr. Leidy further exhibited a drawing of a singular and beautiful animalcule, which he had obtained in his recent visit to Newport, Rhode Island. The animalcule occupies a green, curved, vase-like tube, attached to dead shells, in company with Serpulæ, which were dredged by Mr. Powel from Newport harbor. The vase-like tube has an oblong oval, prostrate body, an erect, narrow neck, and an expanded, convolvulus-like mouth. The body of the animalcule is dark bottle green, and presents the same general structural appearance as the Stentors. From the body projects a funnel-shaped expansion, dividing into two lips like a labiate flower. The margins of the lips and the interior of the funnel are ciliated; and both lips are capable of closing, and with the funnel are retractile within the tube of the animalcule. The size of the latter is almost the fifth of a line in length; and it appears to be allied to the Stentors, and more nearly resembles the Chætospira Müller*i Lachmann*, than any other animalcule Dr. L. had seen described. It was named Freyia Americana.

August 30th.

Mr. LEA, President, in the Chair.

Present thirty-one members.

The following papers were ordered to be printed in the Proceedings:

Description of a type of GOBIOIDS intermediate between Solinæ and Tridentigerinæ.

BY THEO. GILL.

EVORTHODUS Gill.

Body elongated, anteriorly subcylindrical, slowly declining to the caudal. Scales regularly imbricated, extending forwards to the eyes; those of the sides with pectiniform borders; those of the anterior part of the back cycloid. Head thick, abbreviated, subquadrate in profile, above transversely convex, anteriorly truncated. Eyes large, approximated and wholly in the anterior half of the head. Mouth moderate. Tongue thick and stout, but not wide, anteriorly free, and with the margin entire. Teeth uniserial, compressed, straight, with parallel borders and emarginated crowns; those of the lower jaw nearly horizontal. Dorsal fins entirely disconnected; the first with anterior rays slightly filamentary, the second oblong. Caudal and pectorals rounded. Ventrals infundibuliform, with the interspinal membrane low.

This genus is well distinguished by its dentition, and appears to thus connect the true *Solinæ*, whose teeth are acute, with the *Tridentigerinæ*, in which they are tridentiform. The sub-family of *Tridentigerinæ* includes two genera, both of which are peculiar, as far as is known, to the Pacific ocean. In *Tridentiger*, Gill, there is behind the row of tridentiform teeth of each jaw, a row of simple acute ones. In *Trianophorus*,* Gill, simple teeth only are behind the tridentiform ones of the lower jaw. Both of those genera also differ from *Evorthodus* as well as from each other in the form of the head.

EVORTHODUS BREVICEPS Gill.

The body regularly declines from the first dorsal to the end of the second; at the former point, the height is a sixth of the extreme length, and the least height is an eleventh of the same. From the dorsal to the snout, the outline is evenly curved.

The short head constitutes about a sixth of the extreme length; its greatest breadth and width are nearly equal to each other, and each bears a proportion to the length of about thirteen to seventeen.

The eyes are situated entirely in the anterior half of the head; the diameter of an orbit equals a third of the head's length; the interorbital space is narrow.

The mouth is extended very little backwards.

The anal fin commences under the second or third ray of the second dorsal, and has (sometimes) one more ray than that fin.

The caudal, when expanded, has a rounded margin, and forms a fourth of the total length.

$$\begin{matrix} & 1 & & 1 & & & & & & & & & & & & & & & & & \\ \text{D vi, } & 1, & 9 - & \text{A } 1, & 10 - & \text{C } 5, & 7, & 8, & 6, & \text{P } 17, & \text{V, } & \text{I, } & 5+5+1. \\ & 1 & & 1 & & & & & & & & & & & & & & & & & \end{matrix}$$

The color is light brown with irregular blackish blotches along the sides; at the base of the caudal fin are two black spots, one above the other, alternating

* The word *Trianophorus* having been previously used by Rudolphi for a genus in Helminthology, it is proposed to substitute for the ichthyic genus, the name of *Trianophorichthys*, and for the species that of *T. trigonocephalus*.

with one anterior on the peduncle. The first dorsal has two bands parallel with its upper margin; the second has three narrower longitudinal bands.

A single specimen of the species was found in the island of Trinidad, near the mouth of a river in the vicinity of the celebrated Pitch Lake.

Description of a new South American type of SILUROIDS, allied to Callophysus.

BY THEO. GILL.

PIMELETROPIS Gill.

Body naked, moderately elongated and compressed, tapering to the caudal. Head cuneiform in profile, depressed and ovate above, and sloping rapidly outwards. Supraoccipital extended longitudinally backwards, but not connected to a dorsal buckler. Eyes submedian and oblique. Barbels six, consisting of the maxillary and two pairs of mental. Branchial apertures large and continuous under the throat. Branchiostegal rays generally eight. Mouth moderate and terminal; upper jaw slightly protruding. Teeth uniserial, wide, straight and truncated. Lateral line straight and extending to the caudal; anteriorly with lateral branches. Dorsal fin quadrangular, elevated anteriorly, and with its first ray simple and slender. Adipose fin elongated and cariniform. Anal fin similar in form to the dorsal, and under the adipose fin. Caudal fin deeply emarginated, and with equal and pointed lobes. Pectorals pointed, and with the superior ray simple and slender. Ventrals with the second ray longest.

Pimeletropis agrees in almost all of its essential characters with *Callophysus* of Müller and Troschel, but differs in the presence of the single row of teeth in each jaw. The same character, in connection with others, distinguishes it from *Pimelenotus* Gill.

PIMELETROPIS LATERALIS Gill.

The elongated and slender body is highest under the dorsal, and from its termination the dorsal outline commences to slope backwards to the end of the long adipose fin, under the first half of which it is slightly curved, and then nearly straight; the caudal peduncle is slender and elliptical, but at the base of the caudal fin it appears compressed and expanded superiorly and inferiorly, from the recurrence of the rudimentary rays of the fin. The greatest height is about a sixth of the entire length from the snout to the *concave margin* of the caudal fin; that of the peduncle is little more than a third of the former.

The lateral line is perfectly straight, and is anteriorly furnished with diverging branches, which tend obliquely and posteriorly.

The head is above of an oval form, and declines to the region of the posterior nostrils, in a slightly concave line, to the eyes; the sides are posteriorly rounded near the skull, and thence descend obliquely outwards to the opercular margin. The head, from the snout to the margin of the operculum, forms nearly a fifth of the total length, and its greatest breadth bears a relation to this length of fourteen to nineteen. The width regularly diminishes from this point to the angle of the mouth, where the proportion is as ten to nineteen. The snout is obtusely horizontally rounded, and the space between the anterior and posterior nostrils is convex.

The skin is mostly smooth, but papillæ cover the space between the eyes and over the fontanelle; there are also a few meandering dermal grooves below and behind the eyes.

The supraoccipital process is linear, and four times longer than broad.

The eyes are longitudinally oval and contracted by the skin; the longitudinal diameter *within* the skin exceeds a seventh of the head's length; their ante-

rior borders are midway between the snout and opercular margin; the distance from each other is as seven to three, but the interorbital space is only as five and a half to three.

The roof of the mouth is studded with papillæ, especially in a transverse line on the palate.

The lips are thick and minutely papillated.

The maxillary barbels are attenuated at their ends, and extend to or beyond the caudal base.

The teeth are straight and compressed, with parallel sides, and imbedded in the gums; the distance between each is equal to its width. There are more than forty in the upper, and more than fifty in the lower jaw. Behind the teeth there is a papillated ridge, but no teeth.

There are eight branchiostegal rays.

A distinct pectoral pore is present.

The dorsal commences behind the second fourth of the length of the fish, and its anterior ray is longest, and almost equals the height of the body.

The adipose fin is very long and abruptly truncated posteriorly; it is distinctly striated, so as to present a finely rayed appearance.

The caudal fin is deeply lunate; its central rays form an eleventh of the extreme length, and its longest are equal to a fifth.

The pectorals are pointed, and equal a fifth of the length.

The ventrals are shorter than the pectorals, and the second ray is longest.

The following formula indicates the number and character of the rays:—

$$D\ 1,\ 5\frac{1}{1}—0;\ A\ 4,\ 8\frac{1}{1};\ C\ 19,\ I,\ 7,\ 8,\ I,\ 13;\ P\ I,\ 12;\ V\ I,\ 15.$$

The color is silvery beneath, and above merges into a light purplish hue. Along the side there are a number of distinct, nearly round dusky spots. The fins are pearly, opaque at the bases.

The specimen from which this description has been taken, was presented by Mr. A. Edwards to the Lyceum of Natural History, of New York. It was obtained from the Amazon River, with *Cetopsis candiru* Ag., *Enctenogobius bodius* Gill, *Sternopygus macrurus* M. and T., and other species.

New genera and species of North American TIPULIDÆ with short palpi, with an attempt at a new classification of the tribe.

BY BARON R. VON OSTEN SACKEN.

Little attention has been paid by former authors to the North American species of the genera Limnobia *Meig.*, and Erioptera *Meig.*, and the number of those already described is not at all in proportion to the great number of species of some other genera, which have been made known, (as, for instance, Tabanus, Anthrax, and the family of Asilidæ.)

In my Catalogue of the described Diptera of North America, published in 1858 by the Smithsonian Institution, not more than 23 species, coming within the scope of the present publication, are enumerated.* The considerable number of new species of this family contained in my collection of North American Diptera, induced me to undertake their publication.

It was only natural to expect that among so many new species, some new genera would occur. Whosoever has paid any attention to the classification of the *Tipulidæ with short palpi*, knows how very imperfect this classification is, and how the principal genera are established on the habitual and artificial characters. It became necessary, therefore, before proposing new genera to revise the old ones, and to establish them on better characters. I have attempted this, but in judging what I have done, it should be borne in mind, that this

part of my task was in my purpose only a secondary one. I wanted to publish new American genera and species; in order to establish the former I found it necessary to give more precise definitions to already existing genera; I hope these definitions will hold good; but the grouping of these old and new genera according to their natural affinities is the task of a monographist; it requires a study of the family in its totality, embracing the species from all parts of the world; what I have given in this respect is nothing but a temporary arrangement, adopted here, because an arrangement of some kind was required.

It would have been the task of a monographist, for instance, to define more precisely the subdivision of the family of the *Tipulidæ terricolæ* in two tribes, those *with short*, and those *with long palpi*. This subdivision (first adopted by Latreille in 1805, in the 14th volume of his *Histoire naturelle des crustacés et des insectes*,) although excellent, is not sufficient, since there are intermediate forms which it does not embrace; the character itself, on which it is founded, cannot stand alone; in order to be made available, it must be supported by characters taken from other organs. (Among the *Tipulidæ with short palpi* there are some, like Pedicia, Amalopis, Arrhenica, etc., having the last joint of the palpi much longer than the preceding, and showing in this way an approach to the tribe with long palpi.)

Not pretending to write a monograph, I do not define more accurately the group which forms the subject of the present paper; I took it, as defined by former authors, and I could do so the more readily as I have not met with any form of doubtful position.

Without entering into a detailed historical account of the generic and other subdivisions established and subsequently given up by different authors within the group in question, I will advert only to Macquart's attempt to subdivide the genus Limnobia *Meig.*, as it is the most important for my purpose.

Macquart separated from Limnobia *Meig.*, all species *with a petiolate areolet*, and formed of them the genus Limnophila. Now, a more natural subdivision, as will be shown below, is that founded, not on the presence or the absence of the petiolated areolet, but on the presence or absence of the *second radial area*. Nevertheless, Macquart's subdivision was *very near* the true one, because all Limnobiæ with *one* radial area are at the same time destitute of a petiolate areolet, and *most* of those with *two* radial areæ possess this areolet. I say *most* of them, because there are a few species of Limnobiæ *with two radial areæ and no petiolate areolet*, and these species were most unnaturally united by Macquart with the *Limnobiæ with one cubital area*. (The European Limnobia sylvatica *Meig.*, for instance, is one of them; in Macquart's *Histoire naturelle des diptères* it is to be found in the genus Limnobia *Macq.*, together with L. modesta, morio, etc.) This was the fault of his subdivision.

In a paper published by me in the *Stettiner entomologische Zeitung* in 1854, I have suggested that the presence of the *second radial area*, combined with characters taken from the structure of the genital organs, lead to a more natural subdivision. The classification, adopted in the present paper, is the development of this suggestion.

The bulk of the tribe *Tipulæ with short palpi*, may be divided in two sections, showing the contrast of characters expressed in the following two columns:—

* *Limnobia* (*Pedicia*) *albivitta* Wk., *L.* (*Pedicia*) *contermina* Wk., *L. cinctipes* Say, *tenuipes* Say, *rostrata* Say, *macrocera* Say, *argus* Say, fascipennis *Say*, humeralis *Say*, *gracilis* Wied., *carbonaria* Macq., badia *Walk.*, biterminata *Wk.*, ignobilis *Wk.*, simulans *Wk.*, turpis *Wk.*, prominens *Wk.*, (*Rhamphidia ?*), Symplecta cana *Walk.*, Rhamphidia flavipes *Macquart*, *Limnobiorynchus canadensis* Westwood, *Anisomera longicornis* Walk., *Eriopter a caloptera* Say, and the European *E. fascipennis Zett.* I omit the species from the West Indies and Mexico; I omit also Trichocera, no species of this genus having been described by me here. The names printed in italics are those of species which have been identified by me; the others are as yet unknown or doubtful.

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I.	II.	
One radial area.	Two radial areæ.	
Antennæ, 14-jointed.	Antennæ, 16-jointed.	
No distinct pulvilli.	Pulvilli distinct.	
Ungues, with distinct teeth on the underside.	Ungues smooth on the under side.	
No spurs at the tip of the tibiæ.	Tibiæ, with spurs.	Tibiæ, without spurs.
Limnobia *nob.*	Limnophila *nob.*, etc.	Erioptera *Meig.*, etc.

These characters do not exhaust the contrast: the structure of the mouth, and that of the male genital organs, is different in both groups.

The first column, and the two subdivisions of the second, contain thus the characters of the *three principal groups of the tribe.* Among the 87 species described on the following pages, 68, that is, nearly four-fifths of the whole number, belong to these three groups, each of them containing about the same number of species. I will call them Tipulæ limnobiæformes (with 24 species), Tipulæ eriopteræformes (with 25 species), and Tipulæ limnophilæformes (with 19 species), thus deriving the names from those of the typical genera.

A *fourth* group has all the characters of the second, as enumerated above, except that the structure of the antennæ is anomalous; they have 6, sometimes 10, distinct joints, and often reach extraordinary proportions, being in the ♂ of some species three or four times longer than the body. Some other characters, as the structure of the palpi, the presence of a tubercle on the front, etc., justify the separation of this group. A *fifth* group also answers to all the characters of the second; but has, besides, *a mediastinal cross-vein, which is far remote from the tip of the mediastinal vein, and anterior to the origin of the petiole; pubescent eyes; a distinct tubercle on the front, behind the antennæ, and the 4th joint of the palpi elongated;* I call them Tipulæ pedicilæformes. The structure of the ♂ genitals and the neuration of the wings, (especially the form of the discal areolet) in this group, seem to indicate a transition towards the *Tipulæ with long palpi.* The genera Amalopis and Pedicia are the types of the group; Dicranota is closely related to them, although it has 13-jointed antennæ and short palpi; Ula is only provisionally placed in this group on account of its pubescent eyes, the position of its mediastinal cross-vein, etc.

We have seen that the first group reproduces the characters enumerated above in the first column; that the second and third group answer to the characters of the second column; the fourth and fifth group, although somewhat anomalous, show a decided prevalence of the characters of the second column. But there are several genera which possess some of the characters of the *first* and some others of the *second* column at the same time, so that they have no more relation to the one than to the other. They have, for instance, *one radial area* and 16 (instead of 14) *joints of the antennæ;* the structure of their genital organs holds also the middle between the typical forms of the first and second group, with more apparent analogy to the second. But besides this anomalous combination of characters, each of these genera shows some peculiarity of structure, for the most part, so striking, that it appears at once very natural to isolate them from all other groups. I have gathered them all in a *sixth group,* which I have placed between the first and the second, under the name of Tipulæ anomalæ. This group is entirely artificial, and, for this reason only provisional.*

* It will be seen below, that the four genera placed in the group alluded to, have all *one radial area* and *spurless tibiæ.* But, among the species of my collection, which remained undescribed on account of too small number of specimens, there is one which has *one radial area* and *distinct spurs at the tip of the tibiæ,* and thus combines again the characters of the two opposite columns.

In an appendix, I describe an interesting new genus Protoplasa, and a new species of Ptychoptera *Meig.* These two genera, as well as Bittacomorpha *Westw.*, are related to each other, and seem to form a distinct tribe, belonging neither to the Tipulæ with short, nor to those with long palpi. It deserves to be observed that such intermediate groups, combining the characters of two or more larger divisions, groups small in number of species, but singular and anomalous in structure, contain most of the forms which the living fauna has in common with the fossil one. Thus Protoplasa is closely related to the fossil genus Macrochile *Loew;* thus Elephantomyia (among my Tipulæ anomalæ) is closely allied to Toxorhina *Loew*, which has been found living, as well as fossil; thus Rhamphidia of the same group, occurs very frequently as fossil; and it is not at all improbable, that my genera Antocha and Dicranoptycha will be found fossil in the Prussian amber. Another circumstance worth noticing is, that so many of the fossil forms, now extinct in Europe, should be found living in the New World. This observation is not confined to the Tipulidæ only: Professor Loew mentions, in a recent letter to me, that he had repeated it in the Dolichopodæ. It is well known that similar facts have been recorded in other branches of Zoölogy, as well as in Botany.

Many new species and even new genera remain undescribed in my collection, either because I have not been able to procure a *sufficient number* of specimens, or because I had *no fresh specimens* for examination. It will be noticed that at the end of every description I have mentioned the number of specimens which I had for comparison. The importance of this datum scarcely needs an explanation: it is evident that the more specimens have been compared, the more perfect the description ought to be; and it is important for those who have to determine specimens from descriptions, to be enabled to know how far the describer had the means on hand to draw a good description. In a very few instances only I have ventured to describe a species from a single specimen; and that in such cases only where the characters of the species seemed striking enough to secure its recognition. Another important rule to observe, is the study of *fresh and even living* specimens. The structure of the ♂ genital organs can be studied on such specimens only; likewise, it is for the most part very difficult to count the number of joints of the antennæ, and to obtain a correct idea of the form and the relative length of the joints of the palpi, unless from living or recently killed specimens.

Besides the number of specimens which I had for comparison, I have mentioned at the end of every description, the names of the persons from whom I have obtained them. I am exceedingly obliged in this respect for the generous contributions of Mr. S. H. Scudder in Boston, Mr. A. S. Packard in Brunswick, Me., Mr. Edw. Norton in Farmington, Conn., but before all to Mr. Robert Kennicott from Illinois, who put at my disposal highly valuable collections of Diptera, made during his travels in the North Western parts of the Union. The localities where I collected myself are designated by the abbreviation (*nob.*)

Although nearly one hundred N. American species are known to me at present, nearly all which would have been placed formerly in the old genera Limnobia *Meig.* and Erioptera *Meig.*, the fauna in this respect is far from being exhausted. Even now, when this paper is completed, almost every ramble in the country procures me a new species, or, at least, some new fact, deserving to be mentioned in the context. And if I determine upon the publication of this paper, it is only because I am compelled by circumstances which leave me no other choice but to publish it as it is, or to give up its publication altogether.

Several European species have been found by me as occurring here and are redescribed under their old names. Having had no European specimens for comparison, I have identified them partly from recollection, partly from existing descriptions. It may happen also that among my new American species, some.

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will be identified afterwards with European ones. The question of the real or apparent identity of American species with European ones, especially among insects, is a very delicate one, and requires a special investigation. Until some general principles are adopted in this respect, entomologists will have to depend on approximation, and their decisions will always be more or less arbitrary. In any event there is very little harm done in describing under a new name a European species found on this continent. The important point is, to have it well described, and if such is the case, its affinity or identity with the European species will easily be found out afterwards.

The terminology of the neuration of the wing, as explained on the diagram, is for the most part that of Walker. I have introduced some changes, where I could not follow him, as well as additions, where my purpose required it (especially some new names of the cross-veins). My terminology is in many points perfectly arbitrary, but until a rational nomenclature of the neuration of the wings, applicable to all families of Diptera, is adopted, the monographer of every family will be compelled to invent his own. There is no great harm in this, if only the meaning of the terms is clearly explained.

The terminology of the other parts of the body required almost no changes; there was only the thoracic portion between the suture and the scutellum, which had no peculiar name in the former descriptions. I call it *scutum of the mesothorax*, or simply *scutum*, following in this the nomenclature expounded by Westwood in Griffith's Animal Kingdom, vol. xv. p. 722, tab. cxxii. According to the same authority, I call *præscutum of the mesothorax*, or simply *præscutum*, the upper thoracic portion between the collare and the suture.

Not having been able to give figures of the wings of the different species, I have supplied their place by frequent references to the plates in Meigen's, Schummel's* and Walker's works, as well as by descriptions of the neuration.

The circumstance that the genital organs of the male Limnobiæ can be drawn from living specimens only, prevented me from replacing my hand by that of a more skilful draughtsman. I appeal, therefore, to the indulgence of my colleagues in Dipterology.

My friend Dr. John L. Le Conte has kindly volunteered to correct the proofs of this paper, which will be published during my absence, and I tender him my most cordial thanks for this mark of friendship.

Explanation of the terminology of the wing, as used in this paper.

AREÆ AND AREOLETS.

1. Subaxillary area.
2. Axillary area.
3. Anal area.
4. Pobrachial area.
5. Præbrachial area.
6. Mediastinal area.
7. Subcostal area.
8. First radial area.
9. Second radial area.
10. Cubital area.
11. Subapical area.
12. First externomedial, or *petiolate* areolet.
13. Second externomedial areolet.
14. Third externomedial areolet.
15. Fourth externomedial areolet.
16. Discal externomedial areolet.

The areolets from 9 to 15 have been sometimes called collectively *apical areolets*.

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*Beitrage zur Entomologie, besonders in Bezug auf Schlesien, von T. E. Schummel and Herm. Stannius; 8vo. Breslau, 1832.

Among other papers, this collection contains a monograph of the Silesian Limnobiæ, by Schummel.

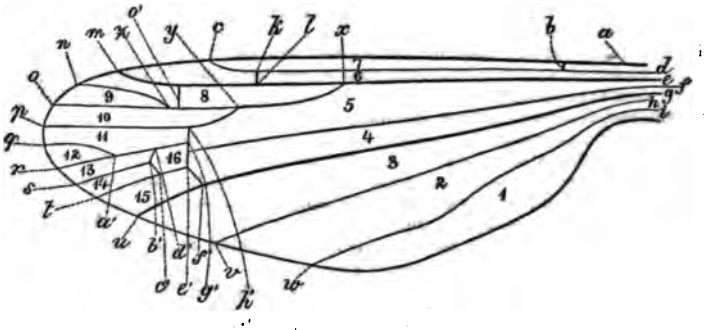

Diagram of a wing with two radial areæ.

VEINS.

am. Costal vein or *costa.*
dc. Mediastinal vein.
em. Subcostal vein.
fy'. Præbrachial vein.
gu. Pobrachial vein.
hv. Anal vein.
iw. Axillary vein.
xy. Petiole of the radial and cubital veins, or simply *petiole.*
yp. Cubital vein.
yn and *yo* radial vein, with its two branches, *sn* the upper, and *so* the *lower* branch.
d'r. First externomedial vein.
b's. Second externomedial vein.
c't. Third externomedial vein.

CROSS-VEINS.

b. Humeral cross-vein.
kl. Mediastinal cross-vein.
o'. Stigmatical cross-vein.
g'h'. Central cross-vein.
g'e'. Upper discal cross-vein
d'b'. First lower discal cross-vein. } Discal cross-veins.
b'c'. Second lower discal cross-vein.
e'f'. Great cross-vein.

The term *central cross-veins* has been also used collectively for the whole extent of the veins *x y h' g' e' f'*, or for a part of them, when they form a more or less straight line across the middle of the wing.

OTHER TERMS WHICH HAVE BEEN USED.

x is *the origin of the petiole.*
yk' is the portion of the cubital vein anterior to the central cross-vein; it has itself sometimes the appearance of a cross-vein, being in one line with the central cross-vein.
nzo is the *radial* fork.
oyp is the *cubital* fork, or simply *the fork* when it is the only one.

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Analytical Table for determining the genera.

I. One radial area; antennæ 14-jointed; ungues armed with teeth on the under side; tibiæ without spurs at the tip; pulvilli indistinct or none; (natural group.) **Limnobia** *nob.*

II. One radial area; antennæ 16-jointed; (*)
(artificial group.)

A. Mediastinal vein indistinct, being closely applied to the subcostal vein; no mediastinal cross-vein apparent; petiole, not arcuated at its origin, but forming an acute angle with the subcostal vein; anal angle of the wing square. **Antocha** *nob.*

AA. Mediastinal vein distinct; petiole arcuated at its origin; anal angle rounded.

B. No stigmatical cross-vein; proboscis elongated; palpi at its tip.

C. Proboscis almost as long as the body. **Elephantomyia** *nob.*

CC. Proboscis shorter than the body, but longer than the head. **Rhamphidia** *Meig.*

BB. A distinct stigmatical cross-vein.

D. A distinct fold, having almost the appearance of a supplementary vein, runs from about the middle of the anal vein, down the anal area, towards the posterior margin of the wing; *no distinct stigma?* proboscis short; wings elongated. **Dicranoptycha** *nob.*

DD. No fold in the anal area; a distinct stigma; proboscis elongated, although shorter than the head; collare prolonged in a narrow, almost linear neck; wings broad, rather short, with a rounded posterior margin, very pure hyaline; the subcostal vein does not extend much beyond the central cross-veins. **Teucholabis** *nob.*

III. Two radial areæ.

E. Tibiæ unarmed with spurs at the tip.

F. Wings pubescent on the whole surface, or their veins clothed with long hairs. **Erioptera** *Meig.*

FF. Wings naked, or only with a short pubescence along the veins.

G. Axillary vein undulated; (see, Meig. i. tab. v. f. 7.) **Symplecta** *Meig.*

GG. Axillary vein straight, or almost straight.

H. The first radial area has the form of an almost equilateral triangle, the petiole being very oblique; ♂ and ♀ genital organs obtuse, without distinct horny appendages. **Cryptolabis** *nob.*

HH. The first radial areas has its usual elongated form; the ♂ genitals have several distinct elongated, horny or coriaceous appendages; the ovipositor of the ♀ consists as usual of horny, pointed valves.

J. The second radial area is very short, almost triangular; the upper branch of the radial fork takes an oblique, sometimes almost perpendicular direction to the lower branch, (like Meig, i. tab. vi. f. 7.) **Gonomyia** *Meig.*

JJ. The second radial area has its usual elongated form, both branches of the fork being more or less parallel.

K. No petiolate areolet; body black. **Gnophomyia** *nob.*

KK. A petiolate areolet; body yellow. **Cladura** *nob.*

EE. Tibiæ armed with spurs at the tip.

L. Axillary vein very short, incurved to the anal angle; wings like Meig. i. tab. vii. f. 9; antennæ long, (as long as head and thorax together) setaceous, terminal joints indistinct. **Trichocera** *Meig.*

LL. Axillary vein extending beyond the anal angle.

M. Antennæ from 6 to 10-jointed.

N. No discal areolet; wings like Meig. i. tab. vii. f. 8. **Anisomera** *Meig.*

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*The antennæ are apparently 15-jointed in Elephantomyia *nob.*

NN. A discal areolet.

O. Antennæ of the ♂ much longer than the body; those of the ♀ short; second joint of the palpi longer than the third. **Arrhenica** *nob.*

OO. Antennæ ♂ of ♀ and of about the same length; both much shorter than the body; second and third joints of the palpi about the same length. **Eriocera** *Macq.*

MM. Antennæ 13 (sometimes apparently 12?) jointed; mediastinal cross-vein, far remote from the tip of the mediastinal vein, *anterior* to the origin of the petiole; wings like Walker, Ins. Brit. Dipt. iii. tab. xxx. f. 7, (having *two cross-veins* between the upper branch of the radial fork and the subcostal vein.) **Dicranota** *Zett.*

MMM. Antennæ 16 (or 17) jointed.

Q. Mediastinal cross-vein far remote from the tip of the mediastinal vein, *anterior* to the origin of the petiole.

R. Wings pubescent. **Ula** *Halid.*

RR. Wings glabrous. { **Amalopis** *Halid.* / **Pedicia** *Latr.*

QQ. Mediastinal cross-vein close by the tip of the mediastinal *vein*, or not far remote from it, and always *posterior* to the origin of the petiole. **Limnophila** *nob.*

Limnobia nob.

(Limnobia *Meig.*, ex parte, inclusive of Rhipidia *Meig.*, Geranomyia *Hal*, and Dicranomyia *Steph.*)

One radial area. Antennæ 14-jointed, (sometimes apparently 15-jointed, the cylindrical prolongation of the last joint appearing in some species as an independent joint). Ungues armed with teeth on the under side. Tibiæ without spurs at the tips. Pulvilli indistinct or none.

The proboscis is always elongated, cylindrical, although generally shorter than the head; in Geranomyia alone (1st Section) it reaches extraordinary proportions. The ♂ genitals vary in structure in the different sections of this genus; but all their forms have one character in common, and that is, the great development of the *anal style*, situated immediately under the forceps. (This organ is designated by the letter *e* on the figures 1, 3, 4, 5, 6, etc., of the plate.)

The group thus characterized, although very natural, comprises various forms on which new subdivisions may be established. But there is no reason to isolate some of them, leaving the others under the old generic denomination. The genus, as defined above, is so compact, that either it must remain in its integrity as a group of higher order, or the whole of it must be subdivided into subordinate groups. This rule has not been observed in former works.

The genus Rhipidia has been established on a European species with pectinated antennæ; the genus Geranomyia on several species with a long proboscis; but both Rhipidia and Geranomyia have more affinity to some species which remained in the genus Limnobia (especially to those which form my 3d Section, Dicranomyia *Steph.*,) than these species have to their neighbors of the same genus, (to the Limnobiæ of my 5th Section.)

The pectinated or moniliform antennæ of Rhipidia are a character of altogether secondary importance; that is they do not indicate a corresponding modification in the rest of the organization. The inconstance of this character is alone sufficient to prove its secondary value: in Rhipidia maculata the antennæ are pectinated in the male and moniliform in the female; in Rhipidia domestica *n. sp.* they are moniliform in both sexes. Such a character may be used in the classification, but it must be subordinate to more important characters.

In Geranomyia likewise the length of the rostrum, although a very good generic character, has apparently but little influence on the rest of the organi-

zation, and should also remain subordinate to more essential characters. (In the same manner the immense proboscis of Limnobiorhynchus does not prevent it from having the closest affinity to some Rhamphidiæ, for instance to my Rh. brevirostris with a comparatively short proboscis.)

Not being able, on account of the scarcity of my materials, to attempt a final partition of the group Limnobia in its present definition, I retain it in its totality as a group of higher order and subdivide it in sections, some of which, (as Rhipidia, Geranomyia, etc.,) are genera already previously established, and which will also be retained in future, and others are only temporary divisions, adopted for want of better ones. The 5th Section especially is not sufficiently defined.

Limnobia in its present definition almost corresponds to Limnobia *Macq.* But, besides that it now includes Rhipidia and Geranomyia, it has been freed from those species, which, like my Limnophila quadrata and L. lenta have *two radial areæ and no petiolate areolet*, and which Macquart, very erroneously, separated from his genus Limnophila, where they belong, and included in his Limnobia, where they are strangers. (See more about it in the preface and in Limnophila.)

Analytical Table.

1. Proboscis prolonged in a haustellum, and both together longer than head and thorax. (Section 1st.) Gen. **Geranomyia** *Helid.*
   (There is a separate analytical table for this genus below.)
   Proboscis shorter than the head, 2
2. Antennæ pectinated or moniliform. (Section 2d.) Gen. **Rhipidia** *Meig.*
   (There is a separate analytical table for this genus below.)
   Antennæ setaceous, 3
3. A supplementary cross-vein between the anal and axillary veins; wings with brown, ocelliform spots; length 3½—4 lines. (Section 6th.) **L. Argus** *Say.*
   No supplementary cross-vein, 4
4. Wings with brown or black spots, or with clouds along the central cross-veins or with brown dots on the anterior margin, 5
   Wings without spots, clouds, etc., only with a more or less distinct stigma, 12
5. Feet black or dark brown, with a *whitish* ring before the tip of the femora, 6
   Feet yellow or brownish yellow, with or without *brown* rings, 7
6. Wings with blackish spots, especially along the anterior margin, and numerous small round dots in the areæ: body blackish; feet black, *a whitish ring at a distance from the tip of the femora about equal to its own width*; length 3½ to 4 lines. (Section 4th.) **L. defuncta** *nob.*
   Wings with a dark stigma and clouds along the central cross-veins; body tawny and brown; feet brown; *a white ring close to the tip of the femora*; length 3—3½ lin. (Section 3d. Dicranomyia *Hal.*) **L. humidicola** *nob.*
7. The stigmatical cross-vein is at the tip of the subcostal vein, 8
   The stigmatical cross-vein is separated from the tip of the subcostal vein by an interval equal at least to half the length of the stigma, 11
8. Latter part of femora with brown rings at some distance from the tip; wings spotted with brown, 9
   Femora yellow, brown at the tip only, and without pale rings; wings with three brown ocelli and nebulosities on the cross-veins; body yellow, with brown dots; length 3½—4 lin. (Section 5th.) **L. triocellata** *nob.*
9. Intermediate stripe of the thorax pale, margined with brown; length 4—5 lin. **L. solitaria** *nob.*
   Intermediate stripe brown or black, capillary, 10
10. *Two* pale rings on the femora; the *lower* branch of the fork formed by the mediastinal cross-vein with the tip of the mediastinal vein is longer than

the upper one; it is *arcuated*, before joining the subcostal vein, whereas the upper one (joining the costal vein,) is short, straight and perpendicular; length 4—5 lines. (Section 5th.) **L. immatura** *nob.*

One pale ring on the femora; both branches of the fork, formed by the mediastinal cross-vein with the tip of the mediastinal vein, are of about the same length; length 5—6 lines. (Section 5th.) **L. cinctipes** *nob.*

11. Thorax with three brown stripes, the intermediate one capillary; wings clouded with brown along the central cross-veins and some of the longitudinal veins; length 4 lines. (Section 5th.) **L. indigena** *nob.*

Thorax with one brown stripe on its anterior part; wings yellowish, with four more or less distinct brown dots along the anterior margin; length 4—4½ lines. (Section 5th.) **L. tristigma** *nob.*

12. Thorax black, shining, pleurae with a silvery reflection; wings infuscated, stigma brown: length 3 lines. (Section 3d.) **L. morio** *Fab.*

Thorax cinereous, with three brown stripes; wings hyaline, stigma infuscated along the cross-vein only, the rest of its surface being paler; length 2½—3½ lines. (Section 3d.) **L. liberta** *nob.*

Thorax ochraceous or brown, with or without stripes, 13

13. Whole antennæ black or brown; body brown, with more or less ochraceous on the thorax, 18

Antennæ, or at least their basal joints, pale, 14

14. Discoidal areolet extant, 15

No discoidal areolet; mediastinal cross-vein removed from the tip of the mediastinal vein at a distance about equal to the length of the stigma, 17

15. Feet yellow, with two brown rings; tip of the mediastinal vein with a brown cloud, **L. tristigma** *nob.*

(See above, No. 11.)

Feet yellow, without brown rings; tip of the mediastinal vein without cloud, 16

16. Ochraceous; abdomen, stigma and knob of halteres infuscated; veins of the wings brown; mediastinal cross-vein at a distance from the tip of the mediastinal vein about equal to the length of the stigma; length 2—2½ lines. (Section 3d.) **L. diversa** *nob.*

The whole body, including the veins of the wings, pale ochraceous; mediastinal cross-vein at some distance from the tip of the mediastinal vein, but nearer than the length of the stigma; length 3—3½ lines. (Section 3d.) **L. pudica** *nob.*

17. Ochraceous; thorax with a brown stripe in the middle; feet tawny; length 2½—3 lines. (Section 3d.) **L. immodesta** *nob.*

Brownish ochraceous; thorax with three brown stripes; feet brown; femora with a pale ring before the tip; length 2½—3 lines. (Section 3d.) **L. gladiator** *nob.*

18. Mediastinal cross-vein near the tip of the mediastinal vein, (the interval between them is much shorter than the length of the stigma,) 19

Mediastinal cross-vein removed from the tip of the mediastinal vein at a distance about equal to the length of the stigma; length 2½—3 lines. (Section 3d.) **L. distans** *nob.*

19. The mediastinal vein joins the costal at some distance beyond the origin of the petiole, (this distance being almost equal to the length of the stigma); tip of the wing finely pubescent; length 3—3½ lines. (Section 3d.) **L. pubipennis** *nob.*

The mediastinal vein joins the costal nearly opposite the origin of the petiole; tip of the wing naked; length 2½—3 lines. (Section 3d.) **L. stulta** *nob.*

1st Section.

GERANOMYIA Halid.

Proboscis slender, longer than the head, prolonged in a haustellum, which

is longer than the antennæ; it consists of a linear, very long lingua, and an equally long labium, divided from the base in two branches; palpi very short, near the tip of the proboscis, but at a considerable distance from the tip of the haustellum.*

The other characters of the genus agree with those of the 3d section, (Dicranomyia *Steph.*) The forceps of the male has the same structure; the habits seem to be the same, both genera being found in damp situations.

This genus was formed by Haliday, in 1833, on a European species, the only, I think, at present known from that part of the world. The American continent seems to be more abundant in Geranomyiæ. Dr. Loew published six species from Brazil, Chili, and the West Indies, and Mr. Walker one from Brazil. I have found three species within the United States.

Macquart's genus Aporosa, (established in 1838), is identical with Geranomyia *Halid.*

Analytical Table.

1. Wings spotted, G. rostrata *Say.*
   Wings not spotted, 2
2. Thorax cinereous, with three black stripes; the mediastinal vein joins the costal nearly opposite the origin of the petiole. G. diversa *nob.*
   Thorax tawny, with brown stripes; the mediastinal vein joins the costal at about the middle of the distance between the origin of the petiole and the tip of the subcostal vein. G. communis *nob.*

G. rostrata. Alis fusco maculatis et nebulosis; long. lin. 3.
Say, Journ. Acad. Phil. iii. 22, 6.
Wiedem. Auss. Zw. i. 35, 20.

Front and vertex cinereous; proboscis and antennæ brown. Thorax gray with more or less distinct brown stripes; the intermediate one appears sometimes slightly capillary; humeri and pleuræ tawny with a hoary reflection; scutellum and metathorax brown, hoary; halteres pale yellow with a brown knob; feet tawny, tips of the tibiæ black, thickly clothed with very short black hairs, and appearing for this reason slightly clavate; tips of tarsi infuscated. Abdomen brown, venter paler. Wings with five nearly square brown spots along the anterior margin; cross-veins and tips of all the veins along the apex and the posterior margin clouded with pale brown.

Four ♂ ♀ specimens. Washington (nob.) Mass. (Harris' Catal. Ins. Mass.) I have caught the same species in Cuba.

G. communis. Pallide fusca, thorace fusco-vittato, alæ hyalinæ stigmate ovali, obscuro; long. lin. 2½—2¾.

Front and vertex cinereous, occiput tawny; antennæ brown, under side of the 1st joint tawny; palpi and proboscis brown, basis of the latter pale. Thorax tawny, with three more or less dark brown stripes; pleuræ yellowish tawny; metathorax brown with a hoary reflection; halteres blackish, with a pale base; feet tawny, tips of femora, tibiæ and tarsi brown. Abdomen brown, margins of segments pale; venter paler. Wings hyaline, slightly cinereous, with a pale brown oval stigma; the tip of the subcostal vein forms a curve joining the radial; the stigmatical cross-vein is a little before their junction; the mediastinal vein joins the costal at about one-third of the distance between the origin of the petiole and the tip of the subcostal vein.

Five ♂ and 3 ♀ specimens. Washington (nob.) Upper Wisconsin River, (Mr. Kennicott).

G. diversa. Thorace cinereo, vittis tribus nigris, alæ subhyalinæ, stigmate pallide fusco; long. lin. 2½—2¾.

* I distinguish here the *proboscis* from the *haustellum*, according to the acceptation of the word laid down in Illiger's Terminology.

Proboscis, palpi and antennæ black; front and vertex cinereous. Thorax cinereous, with three distinct black stripes, the intermediate one extends over the collare; the lateral ones are abbreviated before; pleuræ, scutellum and metathorax hoary; halteres pale at base, dusky at tip; coxæ and basis of femora pale; the rest of the feet more or less dark tawny. Abdomen brown; ♂ forceps paler. Wings slightly infuscated; stigma of an irregular oblong form, pale fuscous; a slight nebulosity at the origin of the petiole; the mediastinal vein joins the costal nearly opposite the origin of the petiole; the stigmatical cross-vein forms with the tip of the subcostal vein an obtuse angle (sometimes approaching a straight line); the cross-vein is situated near the posterior end of the stigma.

♂ and ♀ specimens from Trenton Falls, (nob.) The proboscis (including the haustellum) of this species, are shorter than those of G. communis.

2d Section.

RHIPIDIA Meig.

Antennæ bipectinated or moniliform in the ♂, moniliform in the ♀.

The other characters, as well as the neuration of the wings, and the form of the ♂ forceps (see the figures 8 and 9 of the plate) agree with my 3d section, (Dicranomyia *Steph.*)

I have altered the generic character of this genus as it was adopted by Meigen ("antennæ maris bipectinatæ"), in order to include in it two new species, which are closely allied to R. maculata, but have moniliform antennæ in both sexes.

Analytical Table.

1. Antennæ bipectinated in the ♂, moniliform in the ♀; wings densely spotted with small pale brown spots. **R. maculata** *Meig.*
   Antennæ moniliform in ♂ and ♀, or only *subpectinated* in the ♂; wings with some brown spots along the anterior margin. 2.
2. Antennæ black. **R. fidelis** *nob.*
   Antennæ with the two penultimate joints yellow. **R. domestica** *nob.*

R. maculata. Cinerea-fusca, thorace vitta brunnea, alis fusco maculatis et nebulosis; long. lin. 2½—4.

Meig. Eur. Zweifl. i. p. 153.

Front and vertex dark cinereous; proboscis, palpi and antennæ black. Thorax yellowish cinereous with a broad brown stripe in the middle; lateral stripes short and indistinct on the præscutum, although extended over the scutum; scutellum and metathorax with brown lines in the middle; halteres pale; feet tawny; coxæ and base of femora pale; a brown ring before the tips of the latter; tip of tibiæ brown. Abdomen brownish. Wings cinereous, densely covered with pale greyish brown spots and small round dots; four larger and darker spots along the anterior margin; the 1st near the base, the 2d a little beyond it, the 3d near the origin of the petiole; the 4th at the tips of the subcostal vein; central and lower discal cross-veins clouded; a round spot at the lips of the axillary vein.

Two ♂ and ♀ five specimens. White mountains in September; Trenton Falls in June (nob.); Maine (Mr. Packard); Illinois (Mr. Kennicott).

One of the ♀ specimens is somewhat different from the others in the picture of the wings; the larger spots and the nebulosities on the cross-veins are very dark; the smaller dots, on the contrary, are not so dense as usual, leaving large hyaline intervals between them.

Although I have no European specimens of Rhip. maculata for comparison, I do not doubt of the specific identity of the American specimens.

R. domestica. Antennæ nigræ, articulis reniformibus, subpectinatis;

pænultimus et ante-pænultimus flavi; præscutum brunneopictum; alæ fusco-maculatæ; long. lin. 3–3½.

Front and vertex cinereous; proboscis and palpi brown; eyes almost contiguous, in living specimens dark green above and violet below; antennæ black; penultimate and ante-penultimate joints yellow; flagellum moniliform, its joints reniform. Thorax yellowish brown, sericeous when viewed in a certain light; the thoracic stripes, which are dark brown, become distinct on the posterior part of the præscutum only; the anterior part is occupied by several brown lines and spots; a brown stripe on the pleuræ, running from the collare backwards; another one runs along the coxæ; halteres tawny, with a dusky spot on the knob; feet tawny; coxæ and basis of femora pale; tips of femora, tibiæ and tarsi brown. Abdomen dark tawny; margins of segments brown; ♂ forceps like figs. 8 and 9. Wings slightly brownish, with five or six brown spots along the anterior margin; cross-veins and tips of longitudinal veins clouded; the intervals between the veins also slightly clouded.

Washington, in May and August (nob.) 6 ♂, ♀ specimens.

R. fidelis. Fusca, antennis fuscis, moniliformibus, subpectinatis, alis fusco-maculatis et nebulosis; length 3 lin.

Head, proboscis, palpi and antennæ fuscous; the latter moniliform, subpectinated. Thorax dull brown, slightly hoary on the pleuræ; stripes indistinct; halteres pale; femora pale yellow, brown at the tip; tibiæ and tarsi brown. Abdomen brown; ♂ genitals paler. Wings pale brownish, except the region round the stigma and a narrow margin at the tip, which are hyaline; stigma brown; brown clouds at the origin of the petiole, the mediastinal cross-vein and the origin of the fork; discal and great cross-veins also slightly clouded.

One ♂ specimen from Sharon Springs, N. Y.

3d Section.

DICRANOMYIA Steph.

Body slender; feet long and slender; wings narrow; joints of the antennæ except the basal ones, oval-oblong, with short or moderate verticils, inserted about the middle of the joint; the ♂ forceps (see the figures 3, 4 and 5 of the plate) consists of two soft, moveable, ellipsoidal or subreniform lobes, each being armed on the inside with a short, curved, horny appendage having more or less the shape of a bird's beak (I call it *rostriform* appendage); another horny, long, slender, arcuated appendage (*falciform* appendage), is closely applied to each lobe; a linear, slightly curved anal style below those lobes.

The neuration of the wings in the different species of this section is very uniform (almost like Meig. i. tab. vi. fig. 5); some difference may be found only in the position of the mediastinal vein and its cross-vein, and in the presence or absence of the discal areolet. Its absence occurs very frequently; it is sometimes a good specific character, and sometimes only an occasional variety.

The habits of the species seem to be aquatic; the larvæ probably live in water or mud; the perfect insects are always found in damp situations.

This generic name appeared for the first time in J. F. Stephens's *Catalogue of British Insects* in 1829, and afterwards in *Curtis's Guide* in 1837. I am not aware of any definition of it having ever been published.

D. liberta. Cinerea, proboscide, palpis et antennis nigris, thorace vittis fuscis; alæ subhyalinæ, stigma pallidum, juxta venulam transversalem infuscatum; long. lin. 2½–3½.

Proboscis and palpi black; front and vertex cinereous; antennæ black, verticillate with hairs of moderate length. Thorax cinereous; intermediate stripe broad, fuscous, well defined, capillary (capillarity indistinct in some specimens;) lateral stripes abbreviated before and extended over the scutum behind; a short oblique brown line runs from the intermediate stripe towards a deep puncture near the humerus; scutellum slightly tawny on the margins;

halteres pale, knobs dusky; feet dark tawny, pale at base, brown ring at the tip of femora often scarcely apparent; tips of tibiæ and those of tarsi brown. Abdomen cinereous; ♂ forceps pale tawny; its structure like fig. 4. Wings hyaline, faintly tinged with grey; veins brownish, pale at basis; costal and subcostal pale; stigma oblong, pale, distinctly clouded *at the cross-vein;* the mediastinal vein joins the costal nearly opposite the origin of the petiole; sometimes a little before or beyond it: the cross-vein is near its tip; the great cross-vein is generally a little before the discal areolet; sometimes it is in one line with the upper discal cross-vein.

Eleven ♂ and six ♀ specimens.

Common near Washington in summer. I have also specimens from Mobile, Ala., and Dalton, Ga., (nob.) and Wisconsin, (Mr. Kennicott).

In one of the specimens the discal areolet, on one wing only, is open.

In another specimen (a ♀) the second externomedial areolet takes an oblique direction and joins the first, forming by this a petiolate areolet. This is the case on both wings.

D. humidicola. Fusca, abdomine fasciis pallidis, pedibus fuscis, femorum apice pallido, alis subcinereis, cinereo nebulosis; stigmate subquadrato, fumato; long. lin. 3–3½.

Proboscis, palpi and antennæ black; joints of the flagellum subglobular, becoming more elongated towards the tip; verticils moderate; front and vertex dark cinereous. Thorax tawny; the stripes brown, moderately distinct, more or less confluent; humeri yellowish, with a faint yellow, sericeous reflection; scutum, scutellum and metathorax brown, the first two with more or less yellow spots; pleuræ brown, with pale spots; halteres pale, knob infuscated; coxæ pale; feet tawny, a pale ring close at the tip of the femora. Abdomen tawny, with pale bands on the incisures; ♂ forceps like fig. 3; ovipositor of the ♀ furruginous. Wings subcinereous, with darker shades of gray at the tip, in the middle of the præbrachial areolet, in the pobrachial, (along the pobrachial vein) and in the first externo-medial (along the same vein;) the central cross-vein, all the discal cross-veins and the great cross-vein, are clouded; there is a pale brown spot at the margin of the petiole; another, larger and nearly round spot at the junction of the radial and cubital veins; stigma brown, nearly parallellopipedal; the mediastinal vein joins the costal generally a little beyond, sometimes nearly opposite the origin of the petiole; the cross-vein is near its tip; the great veinlet is generally a little before the discal areolet; the color of the veins is brown.

Washington, Trenton Falls (nob.), Connecticut (Mr. Norton). Common in damp, shady situations, especially in hollows having a spring at the bottom. Compared twelve (♂, ♀) specimens. One of my specimens has a stump of a vein on the curve of the petiole.

A variety of this species (consisting, perhaps, of immature specimens?) has no clouds on the wings; the stigma is brown, as usual. I caught them in numbers at Sharon Springs, N. Y. Such specimens are easily recognized *by the pale tip of the femora, which is a very characteristic mark of the species.*

D. stulta. Fusca, humeris, pleurisque pallidis, alis subcinereis, stigmate pallide cinereo; long. lin. 2¼–3.

Proboscis and palpi black; antennæ black, hardly reaching much beyond the fore-coxæ; joints of flagellum oblong, with moderate verticils; front and vertex dark cinereous. Thorax yellowish tawny; stripes brown, more or less shining, almost confluent; intermediate one extending over the collare, and sometimes faintly capillary; the lateral ones are extended over the scutum; scutellum and metathorax brown; halteres infuscated, pale at base; feet brownish, pale at base. Abdomen brown; ♂ genitalia paler; the rostriform appendage is small, and has two erect bristles; ♀ ovipositor ferruginous. Wings subcinereous, stigma oblong, pale; veins pale brown; the tip of the

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mediastinal vein is opposite the petiole; the mediastinal cross-vein is very near its tip (the distance is slightly variable in different specimens;) the great veinlet varies its position (as in D. liberta;) the upper discal cross-vein is generally arcuated.

Twenty-three ♂ and ♀ specimens. Trenton Falls, N. Y.; Berkeley Springs, Va., and Quebec, Canada, (nob.)

D. distans. Very like D. stulta, but mediastinal cross-vein separated from the tip of the mediastinal vein by a distance about equal to the length of the first externomedial vein. The thorax is less shining, and appears slightly yellowish sericeous; length, lin. 2¼–3.

I have 6 (♂ and ♀) specimens, all taken in Florida in March, 1858.

Besides these specimens I brought five others from the same locality, distinguished from the former by the *absence of the discal areolet*, which is open, and by the *shortness of the petiole*, which is not longer than the great cross-vein, and originates at some distance beyond the tip of the mediastinal vein; the position of the mediastinal cross-vein is like in D. distans. Among these five specimens there is a ♂ and a ♀ which I caught in copulation; and as they agree in the above mentioned characters, it would prove, perhaps, that these are not merely accidental, but specific differences.

D. pubipennis. Fusca, thoracis disco fusco-nigro, antennis palpisque nigris, stigmate cinereo; areolis apicalibus sparse pubescentibus; long. lin. 3–3¼.

This species is also very like D. stulta, but it is easily distinguished: 1st, by its size, which is a little larger; 2d, by its color, which is darker, especially on the thorax; 3d, by some peculiarities in the neuration of the wings; the mediastinal vein reaches considerably beyond the origin of the petiole; the cross-vein is near its tip; the distance between the cross-vein and the origin of the petiole is about equal to the length of the discal areolet; the two cross-veins, which divide the stigma transversely, do not form an almost straight line, like in D. stulta; the lower cross-vein is arcuated, and advances a little towards the tip of the wing; the apical part of the wing is finely pubescent, which pubescence does not reach the central cross-veins.

Eleven male and 9 female specimens, caught in May, 1859, at Relay House, (near Baltimore.) Five of these specimens (3 ♂ and 2 ♀) *have the discal areolet open*; one of them has it imperfectly closed.

D. immodesta. Pallide silacea, thorace vitta fusca, abdominis tergo infuscato, alis hyalinis, stigmate pallido, areola discoidali aperta; long. lin. 2½–3.

Proboscis pale, palpi infuscated, antennæ fuscous, pale at base, front infuscated. Thorax ochraceous, paler on the pleuræ; collare and præscutum with a brown stripe in the middle which does not reach the scutum; halteres pale, knob dusky; feet pale tawny, coxæ and basis of femora pale yellow; tips of tarsi darker. Tergum infuscated; ♂ forceps pale. Wings with a slight yellowish-cinereous tinge; stigma elliptical, pale; the mediastinal vein joins the costal nearly opposite, or a little before the origin of the petiole; mediastinal cross-vein separated from the tip of the mediastinal vein by an interval a little longer than the stigma; stigmatical cross-vein generally in a line with the tip of the subcostal vein; sometimes it recedes a little, and then the tip of the subcostal is arcuated towards the radial vein.

Washington, Trenton Falls (nob.); Maine, (Mr. Packard.)

Twenty-five ♂ ♀ specimens.

This species is not unlike the European D. modesta, which, however, generally has a discal areolet, its absence being an exception; on the contrary I have not found as yet a specimen of D. immodesta with this areolet closed.

halteres pale, knobs dusky; feet dark tawny, pale at base, brown ring at the tip of femora often scarcely apparent; tips of tibiæ and those of tarsi brown. Abdomen cinereous; ♂ forceps pale tawny; its structure like fig. 4. Wings hyaline, faintly tinged with grey; veins brownish, pale at basis; costal and subcostal pale; stigma oblong, pale, distinctly clouded *at the cross-vein;* the mediastinal vein joins the costal nearly opposite the origin of the petiole; sometimes a little before or beyond it: the cross-vein is near its tip; the great cross-vein is generally a little before the discal areolet; sometimes it is in one line with the upper discal cross-vein.

Eleven ♂ and six ♀ specimens.

Common near Washington in summer. I have also specimens from Mobile, Ala., and Dalton, Ga., (nob.) and Wisconsin, (Mr. Kennicott).

In one of the specimens the discal areolet, on one wing only, is open.

In another specimen (a ♀) the second externomedial areolet takes an oblique direction and joins the first, forming by this a petiolate areolet. This is the case on both wings.

D. humidicola. Fusca, abdomine fasciis pallidis, pedibus fuscis, femorum apice pallido, alis subcinereis, cinereo nebulosis; stigmate subquadrato, fumato; long. lin. 3–3¼.

Proboscis, palpi and antennæ black; joints of the flagellum subglobular, becoming more elongated towards the tip; verticils moderate; front and vertex dark cinereous. Thorax tawny; the stripes brown, moderately distinct, more or less confluent; humeri yellowish, with a faint yellow, sericeous reflection; scutum, scutellum and metathorax brown, the first two with more or less yellow spots; pleuræ brown, with pale spots; halteres pale, knob infuscated; coxæ pale; feet tawny, a pale ring close at the tip of the femora. Abdomen tawny, with pale bands on the incisures; ♂ forceps like fig. 3; ovipositor of the ♀ furruginous. Wings subcinereous, with darker shades of gray at the tip, in the middle of the præbrachial areolet, in the pobrachial, (along the pobrachial vein) and in the first externo-medial (along the same vein;) the central cross-vein, all the discal cross-veins and the great cross-vein, are clouded; there is a pale brown spot at the margin of the petiole; another, larger and nearly round spot at the junction of the radial and cubital veins; stigma brown, nearly parallellopipedal; the mediastinal vein joins the costal generally a little beyond, sometimes nearly opposite the origin of the petiole; the cross-vein is near its tip; the great veinlet is generally a little before the discal areolet; the color of the veins is brown.

Washington, Trenton Falls (nob.), Connecticut (Mr. Norton). Common in damp, shady situations, especially in hollows having a spring at the bottom. Compared twelve (♂, ♀) specimens. One of my specimens has a stump of a vein on the curve of the petiole.

A variety of this species (consisting, perhaps, of immature specimens?) has no clouds on the wings; the stigma is brown, as usual. I caught them in numbers at Sharon Springs, N. Y. Such specimens are easily recognized *by the pale tip of the femora, which is a very characteristic mark of the species.*

D. stulta. Fusca, humeris, pleurisque pallidis, alis subcinereis, stigmate pallide cinereo; long. lin. 2½–3.

Proboscis and palpi black; antennæ black, hardly reaching much beyond the fore-coxæ; joints of flagellum oblong, with moderate verticils; front and vertex dark cinereous. Thorax yellowish tawny; stripes brown, more or less shining, almost confluent; intermediate one extending over the collare, and sometimes faintly capillary; the lateral ones are extended over the scutum; scutellum and metathorax brown; halteres infuscated, pale at base; feet brownish, pale at base. Abdomen brown; ♂ genitalia paler; the rostriform appendage is small, and has two erect bristles; ♀ ovipositor ferruginous. Wings subcinereous, stigma oblong, pale; veins pale brown; the tip of the

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mediastinal vein is opposite the petiole; the mediastinal cross-vein is very near its tip (the distance is slightly variable in different specimens;) the great veinlet varies its position (as in D. liberta;) the upper discal cross-vein is generally arcuated.

Twenty-three ♂ and ♀ specimens. Trenton Falls, N. Y.; Berkeley Springs, Va., and Quebec, Canada, (nob.)

D. distans. Very like D. stulta, but mediastinal cross-vein separated from the tip of the mediastinal vein by a distance about equal to the length of the first externomedial vein. The thorax is less shining, and appears slightly yellowish sericeous; length, lin. 2½–3.

I have 6 (♂ and ♀) specimens, all taken in Florida in March, 1858.

Besides these specimens I brought five others from the same locality, distinguished from the former by the *absence of the discal areolet*, which is open, and by the *shortness of the petiole*, which is not longer than the great cross-vein, and originates at some distance beyond the tip of the mediastinal vein; the position of the mediastinal cross-vein is like in D. distans. Among these five specimens there is a ♂ and a ♀ which I caught in copulation; and as they agree in the above mentioned characters, it would prove, perhaps, that these are not merely accidental, but specific differences.

D. pubipennis. Fusca, thoracis disco fusco-nigro, antennis palpisque nigris, stigmate cinereo; areolis apicalibus sparse pubescentibus; long. lin. 3–3½.

This species is also very like D. stulta, but it is easily distinguished: 1st, by its size, which is a little larger; 2d, by its color, which is darker, especially on the thorax; 3d, by some peculiarities in the neuration of the wings; the mediastinal vein reaches considerably beyond the origin of the petiole; the cross-vein is near its tip; the distance between the cross-vein and the origin of the petiole is about equal to the length of the discal areolet; the two cross-veins, which divide the stigma transversely, do not form an almost straight line, like in D. stulta; the lower cross-vein is arcuated, and advances a little towards the tip of the wing; the apical part of the wing is finely pubescent, which pubescence does not reach the central cross-veins.

Eleven male and 9 female specimens, caught in May, 1859, at Relay House, (near Baltimore.) Five of these specimens (3 ♂ and 2 ♀) *have the discal areolet open*; one of them has it imperfectly closed.

D. immodesta. Pallide silacea, thorace vitta fusca, abdominis tergo infuscato, alis hyalinis, stigmate pallido, areola discoidali aperta; long. lin. 2½–3.

Proboscis pale, palpi infuscated, antennæ fuscous, pale at base, front infuscated. Thorax ochraceous, paler on the pleuræ; collare and præscutum with a brown stripe in the middle which does not reach the scutum; halteres pale, knob dusky; feet pale tawny, coxæ and basis of femora pale yellow; tips of tarsi darker. Tergum infuscated; ♂ forceps pale. Wings with a slight yellowish-cinereous tinge; stigma elliptical, pale; the mediastinal vein joins the costal nearly opposite, or a little before the origin of the petiole; mediastinal cross-vein separated from the tip of the mediastinal vein by an interval a little longer than the stigma; stigmatical cross-vein generally in a line with the tip of the subcostal vein; sometimes it recedes a little, and then the tip of the subcostal is arcuated towards the radial vein.

Washington, Trenton Falls (nob.); Maine, (Mr. Packard.)

Twenty-five ♂ ♀ specimens.

This species is not unlike the European D. modesta, which, however, generally has a discal areolet, its absence being an exception; on the contrary I have not found as yet a specimen of D. immodesta with this areolet closed.

D. gladiator. Fusco-silacea, thorace vittis tribus fuscis, abdomine fusco; pedibus fuscis, femorum apice infuscato, alis hyalinis, stigmate infuscato, areola discoidali aperta; long. lin. 2½—3.

Proboscis pale ochraceous, palpi infuscated, antennæ brown, pale at base. Thorax brownish ochraceous, with three distinct brown stripes on the præscutum; the intermediate one extends over the collare; the lateral ones over the scutum; scutellum and metathorax brown in the middle; pleuræ with a large brown spot near the intermediate coxæ and several smaller, indistinct spots; halteres pale at base; knob brown; feet brown, coxæ and base of femora pale; tip of the latter brown, *with a pale ring before it.* Abdomen brown, posterior margins of segments and genitals paler; falciform appendages of the ♂ forceps very large; (fig. 5,) they are very striking in the living insect and when their points touch each other, they form a kind of arch or bridge over both lobes. (The name of the insect is derived from their sword-like appendages). Wings slightly subcinereous; stigma elliptical, more or less infuscated; neuration exactly like that of D. immodesta.

Fourteen ♂ ♀ specimens. Washington in June (nob.)

If it was not for the structure of the ♂ forceps and for the circumstance that large numbers of D. gladiator occur in localities where not a single specimen of D. immodesta is to be found, and vice versa, I would have taken the former species only for a darker variety of the latter.

D. diversa. Pallide silacea; antennarum flagello, halteribus, tarsorumque apicibus fuscescentibus; alis hyalinis, stigmate pallide infuscato; venis fuscis; long. lin. 2—2½.

The abdomen is slightly infuscated, the genitals are yellow. Otherwise this species is not unlike D. immodesta from which it is easily distinguished by its smaller size, the presence of a discal areolet, the absence of the brown stripe on the thorax, and the wings, which are purer hyaline. The mediastinal cross-vein is, like in D. immodesta, at a distance from the tip of the mediastinal vein, which is about equal to the length of the stigma.

Five ♂ and ♀ specimens.

Washington and Maryland in the Spring (nob.)

D. pudica. Pallide silacea tota; oculis nigris, tarsorum apicibus fuscis; alis pallide flavescentibus, venis pallidis; long. lin. 3—3½.

There is not much to add to this diagnosis; the stigma is scarcely apparent, being of the same pale yellowish color as the rest of the wing; the mediastinal vein joins the costal a little before the petiole: the cross-vein is not far from its tip (at a distance shorter than half the length of the stigma.)

Two ♂ and four ♀ specimens from Illinois, (Mr. Kennicott.)

D. morio. Thorace nigro, nitido, pleuris argenteo-micantibus; alis pallide infuscatis, stigmate fusco; long. lin. 3.

Tipula morio Fab. Ent. Syst. iv. 242, 40; Syst. Ant. 32, 42.

Limnobia leucocephala Meigen, Auss. Zw. i., 136, 37.

Limnobia morio Meig., ibid. vi. 274; Walker Ins. Brit. Dipt. iii. 296, 32.

Head black, front silvery; antennæ and palpi black; last joint of the former ending in a slender, cylindrical prolongation, which might be taken for a 15th joint. (For this reason Meigen, vol. vi. p. 274, counted 15 joints in this species.) Thorax black, shining on the præscutum, silvery on the pleura; halteres with a blackish knob; feet pale brown, coxæ pale. Abdomen brownish with pale margins of the segments. Wings pale brownish, stigma darker brown.

Eight ♂ ♀ specimens from Trenton Falls (nob.)

Although not having European specimens of this species for comparison, I hardly doubt of their specific identity.

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4th Section.

Ungues with several notches on the underside, (and not with long teeth as in the other sections of the genus.) Forceps of the ♂ belonging to the same typical form with that of Dicranomyia, but with more elongated, slender lobes. (Fig. 1 and 2.)

L. defuncta. Fusco-cinerea, thorax vittis tribus nigro-fuscis, intermedia capillari; pedes nigro-fusci, femora versus apicem annulo albido; alae fusco maculatae; long. lin. 3½–4.

Head cinereous; front and vertex almost black in the middle; proboscis, palpi and antennæ fuscous; joints of the flagellum subglobular, with short verticils. Thorax cinereous with a yellowish reflection; three dark brown stripes on the præscutum, the intermediate one capillary; the lateral ones abbreviated before, and extended over the scutum behind; pleuræ variegated with brown; halteres pale with black knobs; coxæ cinereous, feet brown, base of the femora tawny; a very distinct whitish ring at a distance equal to its own width from the tip of the femora; ungues with several small notches on the underside. Abdomen blackish cinereous; posterior margins of the segments paler; genitals pale. Wings subcinereous, spotted with blackish brown; subcostal area infuscated at four intervals; several spots, forming a short band, along the central cross-veins; series of small, round dots along the middle of the area; a larger spot in the axillary area, at the tip of the axillary vein; stigma square.

Common near Washington, especially in May. It occurs near running water, and is often found on stones or rocks over which a thin sheet of water is running. I possess the same species from the Trenton Falls and Quebec, (mob.) and from Maine (Mr. Packard.)

Compared 8 males and 4 female specimens.

5th Section.

(Limnobiæ veræ.)

Collare long, well developed; joints of the antennæ (except the basal ones) elongated, suboylindrical, slightly incrassated at the base; verticils long, inserted on the incrassation and before the middle of the joint; ultimate joint sometimes twice as long as the penultimate, and apparently consisting of two joints; feet stout; ungues strong with a large tooth in the middle of the under side and smaller ones nearer to the base; wings long and broad; the ♂ forceps consists of two suboylindrical, coriaceous halves; to each is attached a pair of closely contiguous, curved moveable lamellae; the outer lamella seems to be horny; the inner one is of a softer consistence; they vary in size and form in different species. (See the figures 6 and 7 of the plate.) The difference between their structure and that of the forceps of Dicranomyia seems to be more apparent than real, and to depend entirely on the great distension of the soft portion of the forceps in the latter genus; the solid, horny parts seem to have the same structure in both genera. Thus, in L. solitaria the soft parts, marked *ff* on the plate, might be the analogues of the large lobes of Dicranomyia, only in a rudimentary state.

The colors of this group are bright (generally ferruginous or yellow) with well marked brown stripes and spots. The habits are terrestrial; the larvæ live in decaying wood or fungi; the perfect insect is found in localities where these matters abound. (The larva of L. annulus, a European species of this group, is described by Van Roser, as being, in shape and color, like a common earthworm; it lives in decaying wood; that of L. xanthoptera, another European species, has been found by Stannius and Bremi in Agarics.)

The contrast between this section and the 3d (Dicranomyia) is great,

and appears in the whole organization as well as in the habits of the species. Still this contrast is not equally marked in all the species of the present section. Its typical representatives are the European L. annulus, quadrimaculata, etc., and the American L. cinctipes, solitaria, immatura; next come the European L. xanthoptera and the American L. indigena, triocellata; finally the European L. macrostigma, tripunctata, etc., and the American L. tristigma. In these species, the striking habitual characters of the types are softened down, and the contrast with Dicranomyia is weakened. The structure of the forceps of the ♂ undergoes modification in accordance with the rest of the body.

For this reason I consider the establishment of this section as only provisional, not having been able for the present to effect a better subdivision.

L. cinctipes. Thorax vittis quatuor, femora annulis duobus fuscis; alæ fusco maculatæ et nebulosæ; ad apicem venæ subcostalis macula ocellata; long. lin. 5–6.

Say, Journ. Acad. Phil. iii. 21, 4.

Wiedem. Auss. Zweifl. i. 32, 15.

Proboscis and palpi infuscated; antennæ fuscous, first three joints ferruginous; front cinereous; vertex with a brown spot; its sides, as well as the underside of the head, reddish yellow. Collare yellow with brown spots; præscutum with four black stripes; the intermediate ones approach the collare before and reach the scutum behind; the lateral ones are abbreviated before and extend behind over the scutum, the sides of the scutellum and the metathorax; there are some indistinct brown spots on the humeri and the pleuræ; the ground color of the thorax (that is the interval of the stripes, as well as the pleuræ,) has a pale yellowish sericeous reflection; the anterior part of the intermediate stripes has a reflection of the same color; halteres pale, with a brown ring a little below the middle of the stem, and a brown spot at the base of the knob; feet ferruginous yellow; femora with two brown rings; the one a little beyond, the other near the tip; tarsi infuscated. Abdomen ferruginous yellow; segments of the tergum with black stripes on their posterior margins; lateral edge of the abdomen also black; venter yellow; genitals of ♀ ferruginous. Wings yellowish with brown spots and clouds; four spots near the anterior margin; the first near the basis: second, at origin of the petiole; third, double spot, at the tip of the mediastinal vein and the origin of the fork; fourth, ocellated, at the tip of the subcostal vein; cross-veins infuscated; a pale grey band, beginning at the anterior margin, near the tip, crosses the apical area, sends a branch across the discal areolet and expands into a large diluted spot in the last externo-medial area; several diluted pale grey shades in the anal, axillary and subaxillary areæ, leaving some pellucid spots along the posterior margin.

Missouri (Say,) Illinois (Mr. Kennicott,) Mass. (Mr. Scudder.)

I have but two specimens in my possession, one of which seems immature, its thorax being yellowish; the description is drawn from the other (a, ♀) which is darker in its coloring and shows the peculiar sericeous reflection mentioned above.

L. immatura. Thorax vittis quatuor, femora annulis tribus fuscis; alæ fusco-maculatæ et nebulosæ, macula ad apicem venæ subcostalis integra (nec ocellata); long. lin. 4–5.

Very like the preceding species, but showing the following differences: it is smaller in size; the femora, besides the two brown rings *beyond* the middle, have a third one *in* the middle; it is pale, although distinct, especially on the anterior pair; the lateral edges of the abdomen are black, but there are no black stripes on the posterior margins of the segments; there is a brown spot instead of an ocellus at the tip of the subcostal vein; the grey band at the

tip of the wing and the diluted spots along the posterior margin are much darker.

Other differences, perhaps of less consequence, which I notice in my specimens are; that the brown marks on the humeri are more distinct; that the brown spots on the pleuræ are more numerous and darker; that the base and the tip of the halteres are pale, the whole intermediate portion being dusky.

Three specimens, (one ♂ and two ♀) Washington, in May, (nob.) Upper Wisc. river (Mr. Kennicott,) Maine (Mr. Packard.)

L. solitaria. Thorax vitta media pallida, fusco-marginata, alæ fusco-maculatæ et nebulosæ; in area pobrachiali serie punctorum fuscorum; long. lin. 4–5.

Proboscis and palpi infuscated; front yellowish cinereous; vertex infuscated; antennæ fuscous, first joint yellow; the two or three following yellowish at base, infuscated at tip. Thorax yellowish; a brown stripe on the collare; a pale yellowish stripe, limited on both sides, by brown lines, on the præscutum; two lateral brown stripes, abbreviated before and extended over the tum behind; scutellum and metathorax pale yellowish sericeous both with lateral brown spots; pleuræ pale yellowish; halteres with brown knobs; coxæ pale; femora tawny; a pale ring beyond the middle, followed by a brown one near the tip; tibiæ and tarsi tawny, infuscated at their tips. Abdomen yellowish ferruginous; an indistinct brown band, formed by a series of spots in the middle of the tergum; genitals pale; their structure like fig. 6. Wings yellowish with brown spots and clouds; an oblique spot extends from the posterior end of the stigma to the origin of the fork; the margin of the stigma is more or less infuscated; a small brown ring is formed by this margin on one side, and the clouded cross-veins at the tip of the subcostal vein on the other; origin of the petiole infuscated; a series of more or less numerous brown dots runs along the disc of the præbrachial area, the most conspicuous among them being generally those opposite the origin of the petiole: anterior part of the pobrachial vein clouded; discal cross-veins and great cross-veins slightly clouded; a pale brown band across the apical areæ; posterior margin clouded, especially at the tip of the pobrachial and anal veins, and in the subaxillary area.

Two ♂ specimens; Trenton Falls (nob.)

A ♂ specimen from Maine seems to belong to the same species; but it differs by having a spot and not a ring at the tip of the subcostal vein; the spot at the origin of the petiole is larger and confluent with the corresponding dot in the præbrachial area; there are but two dots, instead of a series of dots, in this area, near the base; the last three segments of the abdomen are infuscated; the pale ring on the femora is less distinct.

N. B. Besides the differences mentioned in the descriptions of L. cinctipes, immatura and solitaria, each of these species seems to have a constant distinguishing character in the structure of the fork, formed by the mediastinal cross-vein with the tip of the mediastinal vein. In L. immatura the lower branch of this fork, (joining the subcostal vein,) is longer than the upper one, and arcuated; the upper one (joining the costal vein), is short, straight, and perpendicular.

The contrary is the case in L. solitaria; here the upper branch is longer and arcuated; the lower being short, straight, and perpendicular. In L. cinctipes both branches are about of the same length. The specimen of L. solitaria from Maine agrees in this respect with the typical specimens.

L. indigena. Flava, brunneo-vittata et marginata; femora annulis duobus fuscis; alæ fusco nebulosæ; long. lin. 4.

Head black; front with a silvery reflection; antennæ and palpi black.

Thorax honey-yellow, shining, with three dark brown stripes; the intermediate one is capillary and does not reach the scutum; the lateral ones are abbreviated before and extended over the scutum behind; scutellum dark brown with a yellow line in the middle; metathorax brown; pleuræ with a brown stripe running from the base of the wing to the intermediate coxæ; a large brown spot anterior to the base of the halteres; the latter pale yellow, faintly infuscated in the middle of the stem; feet yellowish-tawny with two brown rings on the femora, but a little beyond the middle; the other near the tip; tip of tibiæ and tarsi infuscated. Abdomen brown; base of the second and the following segments broad yellow; ♂ forceps like fig. 7. Wings yellowish; stigma fuscous; central cross-veins clouded with fuscous; the tip of the postbrachial vein, the externo-medial veins and the lower discal cross-veins likewise margined with fuscous; fuscous spots about the middle of the præbrachial, postbrachial and anal areolets, forming an interrupted band across the wing; in some specimens they are indistinct.

Maine (Mr. Packard,) Upper Wisc. River (Mr. Kennicott,) Washington, in the Spring, (nob.)

Eight ♂ ♀ specimens.

L. triocellata. Ferruginea, thorace lineis et punctis nigris; alæ flavescentes, ocellis tribus parvis fuscis; long. lin. 3½—4.

Proboscis and palpi brown; antennæ pale ferruginous; front slightly hoary; vertex pale ferruginous. Thorax ferruginous; collare long, with a longitudinal brown stripe in the middle; præscutum shining; two short, brown lines near the collare and four brown spots before the suture; a brown spot on the humerus pleuræ pale ferruginous, slightly hoary, with two or three brown dots between the anterior coxæ and the root of the wing; two lines in the middle and a spot on each side of the scutum; metathorax with brown marks in the four corners; halteres pale, with brown knobs; feet ferruginous, hairy; tips of the femora and last joint of tarsi brown. Wings tinged with yellow; space between costal and subcostal veins more saturate yellow; a small brown spot near the base, between the subcostal and præbrachial veins; a brown ring at the origin of the petiole; another smaller one at the origin of the fork; a third sometimes indistinct one at the posterior end of the stigma; its anterior end is marked with a brown spot; a brown shade on the margin of the wing, between the stigma and the apex; tips of the longitudinal veins clouded.

Washington, Trenton Falls, in July and August (nob.); Upper Wisconsin River (Mr. Kennicott.)

L. tristigma. Pallide ferruginea, thoracis vitta fusca, alis flavescentibus, punctis quatuor marginalibus pallide fuscis, femoribus annulis duobus fuscis; long. lin. 4—5½.

Head, proboscis and palpi black; front slightly hoary; the first joint of the antennæ black at the root, yellow towards the tip; the following four or five joints pale yellow, the rest of the antennæ brown. Thorax pale ferruginous, a broad, brown stripe on its anterior part; it is linear on the collare and cuneiform on the præscutum, the point not reaching the suture; halteres yellow, slightly brownish at the tip; feet yellowish, tawny; femora with two brown rings, one beyond the middle, the other near the tip. Abdomen yellow. Wings yellowish, the interval between the costal and subcostal veins more saturate yellow; stigma pale; four pale brown dots along the anterior margin; the first at the origin of the petiole; the second at the mediastinal cross-vein; the third at the anterior, and the fourth at the posterior end of the stigma; the second is generally the most distinctly marked, the others being sometimes almost obsolete; the mediastinal cross-vein is at the tip of the mediastinal vein; the stigmatical cross-vein is in the middle of the stigma.

Five ♂ and six ♀ specimens from Northern Illinois (nob.)

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This species is very much like the European L. tripunctata *Meig.* Still, judging from the description of the latter it seems to be different.

6th Section.

A supplementary cross-vein between the anal and axillary veins. Forceps of ♂ holding the middle between those of Dicranomyia and of the 6th section (Limnobia vera.) See my figure of the forceps of the European L. annulata *L.*, (imperialis *Lw.*) in the Stett. Entom. Zeit. 1854, tab. i. f. 1, 2.

The only species of this section is closely allied to some species of the 5th section.

L. argus *Say*, Long's Exped. App. p. 358; *Wiedem.* Auss. Zw. i. 33, 17.

I hardly doubt of the identity of this species with the European L. annulata *Lin.* (L. imperialis *Loew;* see the figure of the wing as given by Prof. Loew in Lin. Entom. v. tab. ii. f. 15.)

North Western Territory (Say), Nova Scotia (British Museum), Mass. (Mr. Scudder), Me. (Mr. Packard). I caught several specimens at Trenton Falls in June, 1858.

DICRANOPTYCHA nob.

Antennæ 16-*jointed*, reaching the base of the wing in the ♂, and but little shorter in the ♀; first joint cylindrical, elongated; second stout, obconical, the four or five next oval, the following elongated; verticils moderately long. Eyes naked, almost contiguous below. Proboscis short. Palpi short; second joint short, stout, third a little longer, fourth not much longer than third. Feet long, rather stout, pilose; *tibiæ without spurs at tip; ungues smooth beneath; pulvilli distinct.* Wings elongated, moderately broad, with *one radial area;* neuration somewhat like Meig. I. tab. iv. f. 17; a discal and no petiolate areolet; stigmatical cross-vein apparent; mediastinal vein distinct, with the cross-vein near its tip; axillary vein short, *with a distinct fold, having almost the appearance of a supplementary vein, which runs from about the middle of the anal vein, down the anal area, towards the posterior margin of the wing*, but disappears just before reaching it.

♂ forceps consists of two subcylindrical basal pieces, ending in two falciform or unguiform horny appendages; (fig. 12*a* shows the forceps of D. nigripes; fig. 13 one-half of that of D. sobrina.)

This genus is distinguished from Limnobia *nob.* by the 16-jointed antennæ, the smooth ungues, the presence of distinct pulvilli and the structure of the ♂ forceps, which approaches that of Limnophila *nob.* But it is separated from the latter genus by having but one radial area.

The peculiar fold in the anal area, mentioned among the generic characters, exists in some other genera also; but it is by far not so distinct and more straight. Here, on the contrary, it is characteristic enough to have induced me to derive from its presence the name of the genus.

Dicranoptycha has one character in common with Antocha: it is the peculiar iridescence of the wing, which, in both genera, seems to be due to the great density and minuteness of the microscopic pubescence of the surface. This iridescence is particularly apparent in D. germana, and less in the two other species.

D. germana. Fusco-fulva, alis fulvis, iridescentibus; long. lin. 4—4½.

Head yellowish cinereous; palpi brown; antennæ tawny toward the base, darker towards the tip. Thorax brownish fulvous, posterior part of the præscutum, the scutum, scutellum and metathorax with a cinereous tinge; a line of the same tinge along the middle of the anterior part of the præscutum. (This tinge is generally more distinct in ♀ than in ♂ specimens); lower part of the pleuræ with a hoary reflection; halteres ochraceous; feet ferruginous-tawny,

clothed with black hairs; infuscated at the tips of femora, tibiæ and tarsi. Abdomen fulvous, more or less infuscated; in ♂ specimens the last segment is generally the darkest, the forceps being ochraceous; in the ♀ the whole abdomen is brown, the genitals being pale ferruginous. The wings are of a saturated fulvous tinge, with a peculiar bluish, opalizing reflection; the veins are fulvous and distinctly pubescent; if looked at obliquely, the veins appear yellow on a bluish ground. The neuration is described among the characters of the genus. No distinct stigma. The stigmatical cross-vein is very near the tip of the subcostal vein; the mediastinal vein reaches a little beyond the origin of the cubital area; the latter is longer than the subapical area by about half the length of the discal areolet; the great cross-vein is a little before the middle of the latter; the upper discal cross-vein is generally straight, but in a couple of specimens it is oblique and arcuated. In one specimen the petiole has a short stump of a vein near its origin.

Eight male and nine female specimens, caught near Trenton Falls, where this species was very common in July, 1858.

N. B.—The description is drawn from dry specimens. Among the notes which I took on living ones, I find the following character mentioned: "abdomen yellow, with five brown spots along the lateral margins at the incisures."

D. sobrina. Cinerea, alis subcinereis; long. lin. 4—4½.

Head subcinereous; proboscis tawny; palpi and antennæ black (in some specimens the antennæ are paler at the base); verticils of the latter long. Thorax cinereous; præscutum with three indistinct, infuscated stripes; pleuræ hoary; halteres pale; knob slightly infuscated; feet tawny, densely clothed with a moderately long black pubescence; coxæ pale; tips of the femora a little darker; those of tarsi brown. Abdomen cinereous; venter paler; genitals pale ferruginous; ♂ forceps like fig. 13. (See its description appended to the plate.) Wings subcinereous, iridescent, neuration similar to that of the preceding species; veins clothed with moderately long hairs; the anterior margin of the wing with a fringe of dense, short hairs.

Seven male and five female specimens; caught near Washington, D. C., in June, 1859.

D. nigripes. Fusco-flava, pleuris cano-micantibus; pedibus dense nigro-pubescentibus; femoribus anticis annulo flavo; ventre nigro-maculato; length 4 lines.

Head cinereous; antennæ black; two basal joints ferruginous-yellow; proboscis brownish, palpi black. Thorax brownish yellow; pleuræ, scutum, scutellum and metathorax with a hoary reflection; the latter blackish at the basis; halteres pale; coxæ and base of femora yellowish-ferrugineous, the rest of the feet clothed with a dense black pubescence, which almost entirely conceals the tawny color of the ground; tip of femora black, with a yellow ring before it, which is especially distinct on the anterior pair. Abdomen brownish yellow; the segments of the venter, from the third to the seventh, have transverse black spots in the middle; ♂ forceps represented in figure 12*a*, and described in the explanation of the plates. Wings tinged with brownish yellow, which color appears more saturated and almost ferruginous along the costal margin; there is a fringe of black hairs along the apical margin, between the tip of the subcostal vein and the externo-medial veins; the surface of the wing itself is slightly infuscated along this fringe. Neuration almost like the preceding species; veins finely pubescent.

One ♂ specimen from Dalton, Ga. (nob.); the description was drawn from it when it was yet fresh.

D. sororcula. Thorace pallide cervino, vittis obsoletis; pedibus pallidis; alis pallide fusco-cinerascentibus; length 3½—4 lines.

Head pale brownish yellow with a light grey tinge; palpi brown; antennæ

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brownish; two or three basal joints yellow. Thorax pale brownish yellow, with light vestiges of an intermediate capillary and two lateral stripes; pleuræ with a hoary reflection: halteres pale yellow; feet pale yellow, pubescent, and slightly infuscated at the tips of femora, tibiæ and tarsi. Abdomen yellowish tawny; male forceps somewhat different from that of the preceding species, the *exterior* falciform appendage forming a *simple* and not a *double curve*, as in D. nigripes; it is short and has some bristles at the tip. The wings have a brownish-cinereous tinge, more yellowish along the anterior margin; the neuration is almost like that of the preceding species; veins finely pubescent.

Single ♂ and ♀ specimens from Dalton, Ga. (July, 1859.)

A female specimen from the same locality is more brownish grey on head and thorax. I am not sure if it ought to be considered as a distinct species.

ANTOCHA nob.

Mediastinal vein indistinct, being closely applied to the subcostal vein. No mediastinal cross-vein apparent. Petiole not arcuated near its origin, but straight, and forming an acute angle with the subcostal vein. Anal angle of the wing almost square,* and, in consequence of this, the subaxillary area is nearly triangular. Excepting these peculiarities, the neuration is like that of Dicranomyia *Steph.*; that is, there is *one radial area, a discal, and no petiolate areolet. Antennæ 16-jointed,* short (longer than the head, but not reaching the base of the wing); joints of the flagellum subglobular; last joint elongated; all joints beset with short hairs, the ♂ antennæ being more thickly clothed with them; verticils short. Proboscis short. Palpi shorter than the head, first joint elongated, second and third shorter, the fourth elongated. *Tibiæ without spurs at tip* and without *distinct pulvilli. Ungues with two small teeth near the base.* Forceps of the ♂ like fig. 11, showing more analogy to the type of Limnophila *nob.* than to that of Limnobia *nob.*

The general appearance of the insects of this genus is very like that of Dicranomyia. Antocha is related to all Limnobiæ *with one radial area,* by the analogous neuration of its wings and the structure of the feet, (*no spurs, no pulvilli* and *toothed ungues*). But it is distinct from them and approaches the Limnobiæ *with two radial areæ* (Limnophilæ, etc.) by the number of joints of the antennæ, and, apparently, by the structure of the ♂ forceps.

The wings of both species described below have a peculiar milky-whitish tinge; they are distinctly iridescent, when held obliquely towards the light. Besides, they show another peculiarity: it requires a magnifying power of 150 to discover the microscopic pubescence on their surface; so magnified, they appear covered with black dots, emitting very short hairs. (Much less power is required to show the pubescence on the wing of most of the other Limnobiæ.)

The name of the genus is derived from its principal character, the proximity of the mediastinal and subcostal veins.

A. saxicola. Cinerea, antennis, pedibusque fuscis; coxis, femorum, alarumque basi pallide flavis; long. lin. 2½—3.

Head cinereous; proboscis yellow; palpi and antennæ black. Thorax cinereous, with several tawny, more or less distinct spots on the collare, the humeri and the pleuræ; præscutum yellowish cinereous, with three fuscous, almost

*In order to ascertain this peculiarity of the neuration with more precision, I compressed a wing of A. saxicola between two glass plates. This straightens the fold usually existing in the Limnobia between the costal and subcostal veins and shows the course of the mediastinal vein with greater distinctness; in this case this vein appeared separated from the subcostal by a narrow interval for about one-third of its length only; beyond that both veins ran close along side of each other, till costal, subcostal and mediastinal converged in a stout and elongated anastomose. Under such circumstances there was evidently no room for a mediastinal cross-vein.

confluent stripes; the intermediate one broad; the lateral ones abbreviated before and extended over the section behind. (In some specimens scutum and scutellum have a yellowish tinge); halteres pale with a dusky knob; feet black; coxæ pale yellowish-tawny, tinged with cinereous; base of femora also pale. Abdomen cinereous; ♂ forceps tawny, (fig. 11); ♀ ovipositor ferruginous. Wings with a whitish, slightly milky tinge; veins black; stigma indistinct; stigmatical cross-vein almost obsolete; base of the wing, as well as the veins in that quarter, pale yellow.

Numerous male and female specimens caught near Washington on the 19th of May, 1859, on mossy stones in a creek. I found most of them performing a singular, sideways walk, close to the water's edge; some of them were in copulation.

A. opalizans. Thorace silaceo, vittis infuscatis, pedibus pallide fuscis; alis lacteis, opalizantibus, basi pallida; long. lin. 2¼—2½.

Head cinereous; proboscis yellow; antennæ (except the base) and palpi fuscous. Thorax ochraceous, with three pale brown stripes, the lateral ones sometimes indistinct; halteres pale, knob slightly dusky; feet tawny, slightly infuscated at the tip of the femora; coxæ and base of femora pale. Abdomen brownish; genitals paler. Wings like those of A. saxicola; they have a still more milky, opalizing tinge; their base is likewise pale, etc.; the color of the veins, especially near the costa, is more yellowish.

Six ♂ and four ♀ specimens. Trenton Falls, N. Y., Dalton, Geo., and Montreal, Canada. June, July, (nob.)

The specimen from Montreal has black veins on the wings and fuscous feet, the base only of the femora being pale. The specimen from Dalton has altogether pale feet.

ELEPHANTOMYIA nob.

Proboscis almost as long as the body, very slender, filiform arcuated; palpi inserted at the tip of the proboscis; first joint very short and almost coalescent with the second; both together are much longer than the third, the fourth a little shorter, (conf. Prof. Loew's figures of the palpi of Toxorhina in Lin. Ent. v. tab. ii.) Antennæ *apparently** 15-jointed, longer than the head, but hardly reaching the base of the wings; first joint cylindrical, short; second stout; third oval, stout, the following joints subcylindrical, and more elongated towards the tip of the antennæ; joints of the flagellum clothed with long verticills. Eyes large, naked; front narrow. Collare prolonged in a narrow, almost linear, although moderately long neck. Feet long, slender, without spurs at the tips of the tibiæ. Pulvilli indistinct or none. Ungues without teeth on their underside broad at the base. Wings (somewhat like Meig. i. tab. vi. fig. 6,) with one radial area, a discal and no petiolated areolet; mediastinal vein and cross-vein distinct; no stigmatical cross-vein; anal and axillary veins united by a little cross-vein near the root of the wing. Forceps of the male consisting of a basal piece and two filiform horny appendages, (fig. 12 represents one-half of the forceps.) Ovipositor of the ♀ long, slender and pointed.

The only species of this genus is the Limnobiorhynchus canadensis described by Mr. Westwood in the *Annales de la Société Entomologique de France*, 1835 p. 681. I have to explain the reasons which induced me to form a new genus of this species.

Mr. Westwood has described two species of Limnobiorhynchus: the ♂ and ♀ of L. brasiliensis and the ♂ only of L. canadensis. When, therefore, he mentioned among the generic characters of Limnobiorhynchus that *the wings of the female differ from those of the male by having the radial and median areas coalescent in consequence of the obliteration of the radial vein*, he

* The terminating third joint of the antennæ seems to derive its size from the coalescence of two joints, as that is usually the antennæ are 13-jointed.

[Aug.

is character from the ♀ of L. brasiliensis the only specimen he
he wing of the ♀ of L. canadensis is exactly similar to that of

Loew's genus Toxorhina (Loew, Bernstein and Bernsteinfauna,
rogr. Berlin, 1850, p. 37, and Linn. Entom. v. p. 400, Berlin, 1851, tab.
—23,) comprising several fossil and one living species (from Jamaica)
in its characters with Limnobiorhynchus: it shows the same re-
he obliteration of the radial vein in the ♀; their identity has been
suspected by Mr. Loew himself. He seems to have had only ♀ speci-
n his possession; although not expressly mentioned in his descriptions,
t can be inferred from them. It is highly probable therefore that the
Toxorhina has, like the ♂ Limnobiorhynchus, a complete
rein, or, in other words, that these two genera are synonymous. Mr.
bed's name, as the oldest, has the priority.
mains to be considered now, whether the species canadensis *Westw.*
belongs to Limnobiorhynchus (= Toxorhina) as defined
Westwood and Prof. Loew. The specimens of said species, which
before me, *do not agree* with the definitions of these authors in the fol-
points: 1st. The neuration of the wings *is the same* in both sexes. 2d.
stennæ of Limnobiorhynchus (Toxorhina), are distinctly
by both authors to have long verticils on the terminal joints only, form-
ind of pencil at the tip; the verticils on the other joints are said to be
horter. This is not the case with E. canadensis: the verticils are
l length on all the joints of the flagellum. 3d. The front of Toxorhina
tioned by Prof. Loew as broad. ("The eyes, *at least in the* ♀, says he, are
ted on the upper side by a considerably broad interval.) On the contrary
nt is remarkably narrow in my specimens. 4th. "The thorax," says Prof.
"is distinguished by the horizontal prolongation of the metathorax."
g of the kind is the case with my specimens. 5th. The anal vein in
rhina *Lw.* runs into the pobrachial at a considerable distance from the
f the wing; the little cross-vein which seems peculiar to this genus,
the *axillary vein with the pobrachial.* In my specimens the anal vein takes
al direction towards the base of the wing and the little cross-vein is
nd *between it and the axillary vein.*
er such circumstances I thought that the establishment, at least provi-
lly, of a new genus, with L. canadensis for its type, would be the
warrantable course to pursue in order to prevent further confusion.

anadensis. Pallide silacea; thorace vitta infuscata, femorum apice
segmentis abdominis fusco marginatis; alis subcinereis, stigmate ob-
fusco; long. lin. 3—3½.
nobiorhynchus canadensis Westw., Ann. Soc. Ent. de France, 1835, p.

d yellow; probscis covered with a fine pubescence; antennæ yellow:
ls black; basal joints, especially the second, more or less infuscated.
x yellow; a more or less distinct brown stripe runs along its middle and
the collare, (in some specimens this stripe is altogether obsolete); halteres
feet yellow; femora brown at the tip. Abdomen yellow; posterior mar-
f the segments brown; a more or less distinct brown stripe runs along
iddle of the tergum; the last joint is brown in the ♂; the forceps are
; ♀ ovipositor is ferruginous. Wings pale cinereous; a slight nebu-
along the apical margin; stigma oblong, blackish brown; no vestige of
tical cross-vein; the mediastinal vein, as well as its cross-vein, are in the
s of the distance between the stigma and the origin of the petiole; the
is very short; discal areolet nearly square, the great cross-vein inserted a
before its middle.
great numbers near Trenton Falls, N. Y., in July, 1859, (nob.) Canada,
w.)

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RHAMPHIDIA Meig.

Proboscis elongated, but shorter than the thorax. Palpi inserted at the tip of the proboscis, of moderate length, last joint elongated; front narrow; antennæ 10-jointed, not reaching the base of the wings; first joint cylindrical, elongated; second cyathiform, short; the following joints subcylindrical short, becoming more elongated towards the tip of the antennæ; verticils moderately long. Wings with a distinct mediastinal vein and a cross-vein near its tip; one radial area, a discal and no petiolated areolet; no stigmatical cross-vein. (The neuration is like Meig. vol. i. tab. vi. f. 6, or Schummel, tab. i. f. 1.) Feet long, slender; without spurs at the tip of the tibiæ; ungues smooth beneath; tarsi without distinct pulvilli. Forceps of the male somewhat similar to that of Elephantomyia.

I refer to this genus a male specimen from Wisconsin, which agrees with the characters of Rhamphidia as given by Meigen and Walker (Ins. Brit. Dipt. iii. p. 308.) Only Mr. Walker describes the tibiæ as armed with very short spurs. A careful examination convinced me that they are unarmed, although there are some bristles at their tip which might be mistaken for spurs. The absence of the stigmatical cross-vein, expressly mentioned by Schummel in his description of R. longirostris (Schum. Limnobia, p. 103,) is sufficient in my opinion to settle the question of the generic identity.

The close relation between this genus and Elephantomyia is evident. The comparatively short proboscis, the structure of the palpi and of the second joint of the antennæ, seem to be the only differences. The neuration of the wings, including the absence of the stigmatical cross-veins, is exactly the same; the little cross-vein between the pobrachial and anal veins, apparent on the wing of Elephantomyia, is concealed by a fold in my specimen of Rhamphidia; still it can be distinctly seen by holding the wing in a certain direction. R. brevirostris bears, besides, a most striking resemblance to Eleph. canadensis in the coloring of the body and the wings; the wing of the former is only a little more hyaline, and for this reason the dusky spot at the tip is more apparent; the stigma is less oblong, more square, and the tibiæ are black at the tip, whereas those of E. canadensis are not even infuscated.

The proboscis of R. brevirostris seems to be much shorter than that of the European R. longirostris, (judging from the descriptions of the latter.)

R. brevirostris. Silacea, præscuto et abdomine infuscatis; alis hyalinis, apice infuscato, stigmate fusco; pedibus pallidis; apicibus femorum, tibiarumque nigris; long. lin. $2\frac{3}{4}$.

Head cinereous; proboscis but little longer than the head, fuscous; palpi fuscous; antennæ fuscous at the base; flagellum paler. Thorax ochraceous-yellow; præscutum infuscated; the usual stripes but indistinctly marked; halteres pale; feet pale yellow; tips of the femora and tibiæ black; tips of tarsi also darker. Abdomen yellow; the anterior part of the segments infuscated; last segments and genitals fuscous. Wings hyaline, infuscated at tip; stigma brown, nearly square; the anterior part of the pobrachial vein also infuscated; veins brown; costal and subcostal veins yellow.

Single ♂ specimen, brought from Wisconsin by Mr. Ulke.

This species might possibly be R. prominens *Walk.*, (Dipt. Saund. v. p. 435) although the description disagrees in several points. Rhamphidia flavipes *Macq.*, (Dipt. Exot. Suppl. v, p. 17,) is described as having thorax and abdomen brownish ("fuscana;") in other respects Macquart's description agrees well with my R. brevirostris.

TRICHOLABIS nob.

Wings broad and rather short; posterior margin rounded; mediastinal vein

not reaching beyond the middle of the wing; the mediastinal cross-vein at a moderate distance from the tip of the mediastinal vein; the subcostal vein not much extended beyond the central cross-veins; one radial area and no petiolated areolet: the microscopic pubescence of the wing is distinctly seen under a moderate magnifying power; it is rather sparse, the wing appearing for this reason pure hyaline and transparent. Antennæ 16-jointed, nearly reaching the base of the wing; first joint cylindrical, elongated, second short; flagellum, submoniliform, with oblong joints and long verticils. Proboscis cylindrical, slender, elongated, although shorter than the head; palpi at the tip of proboscis short, last joint very short; eyes naked, moderately remote above, approximated below. Collare prolonged in a narrow, almost linear neck, which is half as long as the head. Feet of moderate length, rather stout, hairy; no spurs at the tip of the tibiæ; pulvilli small. The forceps of the male consists of two oblong lobes, somewhat like those of Dicranomyia: large horny appendages on their under side; anal style distinct, (fig. 10 represents the forceps of T. complexa from above; fig. 10 *a*, one-half of it from below.) Valves of the ♀ ovipositor of moderate length, slender, arcuated.

Is easily distinguishable by its broad, clear wings, the shortness of the mediastinal and subcostal veins; the short, hairy feet, the stout, short thorax, rising abruptly above the abdomen, etc. The 16-jointed antennæ, the structure of the ungues, and the presence of the pulvilli are as many points of analogy with Limnophila *nob.*, the neuration of the wings (which have but one radial area,) and the absence of spurs at the tip of the tibiæ remind on the contrary of Limnobia *nob.* Hence the location of Teucholabis in the present intermediate group. Rhamphidia scapularis *Macq.* Dipt. Exot. i. 1, pl. 10, f. 1, shows some analogy with T. complexa, especially in the neuration of the wings.

T. complexa. Brunneo-flava, thorace vittis tribus brunneis; alis hyalinis; stigmate subrotundo, fusco; long. lin. 2¼–2¾.

Head blackish cinereous, antennæ and palpi black. Thorax yellow with three brown stripes; the intermediate one begins at the collare; the lateral ones are abbreviated before and extended over the scutum behind; scutellum yellow; metathorax more or less brown in the middle, yellow at the sides; pleuræ yellow with more or less distinct brown stripes, running from the collare to the abdomen; halteres pale; feet pale yellowish, hairy; tips of femora and tibiæ brown; last joints of the tarsi brown. Tergum brown, posterior margins of the segments a little paler; ♂ forceps tawny (fig. 10, and 10 *a*.) Wings hyaline, veins brown; costal and subcostal tawny; anterior margin distinctly pilose; stigma distinct, brown, rounded, near the tip of the subcostal vein; the stigmatical cross-vein crosses it; petiole arcuated, but little shorter than the radial vein which appears as its prolongation in a nearly straight line. (For the description of the neuration compare also the generic characters.)

Three ♂ and one ♀ specimens. Washington and Trenton Falls, N. Y., in June, (nob.) Illinois (Mr. Kennicott.)

There is a slight difference in the form of the discal areolet of these four specimens; in one of the males the second lower discal cross-vein is nearer to the upper discal cross-vein than in the others; the areolet in this case appears more square.

GEOPHOMYIA nob.

Antennæ 16-jointed, setaceous; first joint elongated, cylindrical, second cyathiform; the following joints oblong or subglobular, with moderate verticils. Proboscis short. Palpi of moderate length; last joint longer than the preceding. Front convex, eyes glabrous. Feet of moderate length, stout,

covered with a short pubescence; femora slightly incrassated at tip. Tibiæ without spurs at tip. Tarsi with distinct pulvilli. Wings of moderate length, with two radial area and without petiolated areolet; (almost like Meig. i. tab. v, f. 4 or f. 6.) Mediastinal cross-vein at a moderate distance from the tip of of mediastinal vein. Forceps of the ♂ (fig. 18) consisting of comparatively short basal pieces, of the usual horny appendages, one pair are very long, slender, linear and slightly arcuated; the other is short and stout; ♀ ovipositor elongated, slender, slightly arcuated; the lower pair of valves is very short and do not reach much beyond the origin of the upper pair, (fig. 18 *a*.)

This genus is very much like Eriroptera in its general appearance; the body is rather short and stout; the intermediate pair of feet is like in Eriroptera, a little shorter than the other two. But it differs from the latter genus by its glabrous wings and the structure of the genital organs in the ♂ and ♀. The structure of the ♀ ovipositor is somewhat analogous to that of Symplecta. The dark, lugubrious coloring of Gnophomyia seems to be also characteristic. The name of the genus alludes to it.

G. luctuosa. Atra, halteribus atris; alis obscura infumatis; long. lin. 3¼.

The whole body, including the halteres, is of a deep velvet black. Wings smoky, nearly black; subcostal area still darker; stigma hardly distinct; a short almost microscopic pubescence in the centre of the apical areolet; the stigmatical cross-vein is at the origin of the second radial area.

Single ♂ specimen caught in Florida, in March, 1858, (nob.)

G. tristissima. Nigra, pedibus piceis, halterium capitulis flavis; alæ pallide infumatæ, stigmate oblongo, obscuro; long. lin. 2½–3¼.

The whole body is black, moderately shining; thorax gibbose; a slight hoary reflection on the lower part of the pleuræ and sometimes on the front; feet piceous, base of femora dark tawny; halteres brown with yellow knobs; wings dusky with a blackish, elongated stigma, divided longitudinally in two by the subcostal vein; veins black, paler at base; fig. 18 represents the ♂ forceps of this species; fig. 18 *a*, the ♀ ovipositor.

Washington, New York, Virginia mountains in the Spring and in Summer, common. Upper Wisconsin River (Mr. Kennicott.)

Compared eleven ♂ ♀ specimens.

Cryptolabis nob.

Antennæ 16-jointed, joints of the flagellum oval, hairy. Proboscis short; palpi with subcylindrical joints of nearly equal length. Feet moderately long, tibiæ without spurs at the tip. Tarsi with small pulvilli. Wings of moderate length and breadth; petiole very short and oblique, so that the first radial area has the form of an almost equilateral triangle; two radial areæ and no petiolated areolet; the central cross-veins at the base of the second radial, the cubital, the subapical and the first externo-medial areæ, form one line, being connected at their ends; the stigmatical cross-vein (or at least the vein replacing it) is the continuation of the same line; the second externo-medial area is shorter than the first; the great cross-vein is a little nearer to the tip of the wing than the other central cross-veins; the mediastinal cross-vein is a little anterior to the origin of petiole and very indistinct. Forceps of the ♂ somewhat like that of Antocha, but the falciform appendages are small and, in the state of repose, so closely applied to the under side of the basal pieces as to be indistinct. Ovipositor of the ♀ obtuse, soft, without any apparent horny lamels. (Fig. 14, 14 *a* and 15, 15 *a* male and female genitals of C. paradoxa.)

This genus is sufficiently distinguished from all others by the neuration of the wings and the structure of the genitals. The absence of the horny lamels

in the ovipositor and the smallness of the ♂ forceps render the recognition of the sexes very difficult.

C. paradoxa. Thorace livido, nigro-vittato; antennis nigris, pedibus, basi pallidis; alis immaculatis. Length lin. 1–1¼.

Head blackish; palpi and antennæ black. The color of the thorax is livid; but it is scarcely apparent between the black stripes; intermediate stripes broad, capillary; lateral ones extended over the scutum; scutellum pale, metathorax dark; pleuræ blackish; halteres pale; feet clothed with hairs; coxæ and base of the femora pale; their tips brown; tibiæ brownish-tawny, infuscated at tip; tarsi likewise. Abdomen blackish (often greenish in living specimens, the color depends on the food.) Wings hyaline, without apparent stigma; veins brown, costal and subcostal pale yellow; neuration as described among the generic characters; apical areolets slightly pubescent in the middle.

Twenty-one specimens taken at the White Sulphur Spings in Va., on the 30th of June, 1859.

ERIOPTERA Meig.

Wings pubescent on the whole surface, or on the veins only; two radial areæ; mediastinal cross-veins at a considerable distance from the tip of mediastinal vein, although *posterior* to the origin of petiole, the latter nearer than usual to the origin of the wing. Antennæ with 16 joints. Proboscis and palpi short. Tibiæ without spurs at the tip. Pulvilli distinct. Ungues smooth.

The pubescence of the wings is the most striking character of Eriptera; still it is not sufficient for defining the genus, because Ula and several Limnophilæ, have also wings which are pubescent along the veins, or on the whole surface. The characters enumerated above, especially the spurless tibæ, complete the definition.

Erioptera, thus defined, is far from being homogeneous, and exhibits among a comparatively small number of species more variety in the neuration of the wings or the structure of the ♂ genital organs than either Limnobia or Limnophila, although these genera are much richer in species. It has been observed already by Mr. Curtis, (Brit. Entom. 557,) that in some Eriopteræ the antennæ of the ♂ are much longer than those of the female, and that such species show at the same time some peculiarities in the neuration of the wings, and might therefore, with good ground, be separated from the rest of the genus.

My E. hirtipennis and pubipennis belong to the group thus defined by Curtis. My E. chlorophylla, vespertina, septemtrionis, villosa, chrysocoma, etc., seem to form another natural group; my E. Meigenii and nubila a third one; E. caloptera *Say*, and parva *nob.* a fourth, etc.

The ♂ forceps shows a great variety of structure; several pieces are figured on the plate; fig. 19, E. vespertina (one half;) fig. 20, R. armata, upper side; fig 21, the same, side view; fig. 22, E. caliptera; fig. 23, E. venusta, upper side; fig. 13 *a* under side.

Analytical Table.

1. Second radial area shorter than the cubital; petiole ending in the cubital,	2
Second radial longer than the cubital; petiole ending in the second radial; first and third externomedial areolets longer than the subapical, the great cross-vein being much nearer to the base of the wing than the other central cross-veins,	14
2. No discal areolet,	3
A discal areolet,	11
3. *Second* externomedial areolet petiolated; wings like Meig i. tab. iv. f. 9,	4
First externomedial areolet petiolated,	9

4. Surface of the wing naked, the veins alone being hairy, 5
The whole surface of the wing hairy; its color is pale brown; *lower fork shorter than the upper one;* the upper branch of lower fork forms a curve near its origin; the lower branch is straight; body dark cinereous; stripes on thorax obsolete; halteres and base of femora pale; ovipositor ferruginous. Length 2½ lin. Washington, two ♀ spec. (nob.) **E. holotricha.**

5. Body pale green; antennæ, halteres, veins, genital organs, etc., also pale greenish; eyes black. Long. lin. 2—2½. Common ♂ ♀ Washington, Dalton, Ga. (nob.) **E. chlorophylla.**
Body yellow or brown, 6

6. *Knob of halteres brown;* body ochraceous; front whitish, infuscated in the middle; præscutum with more or less distinct, confluent brown stripes, the intermediate one is dark brown on the collare, and the anterior part of the præscutum; tergum infuscated, antennæ, except the base, and palpi brown; wings hyaline, slightly cinereous, immaculate, veins dusky; *hairs much shorter than in the other species of the genus;* feet pale yellow; length 2—2½ lin. Sharon Springs, N. Y. (nob.) Maine, (Mr. Packard.) Six ♂ and ♀ specimens. **E. septemtrionis.**
Knob of halteres pale, 7

7. Body brown; a sulphureous spot on the shoulder extended into a pale stripe towards the basis of the wing; base of femora pale; tip of halteres with a fine, silky, golden yellow pubescence; horny appendages of the ♂ forceps pale, with brown tips; wings dusky; hairs long; long. lin. 2½. Middle States (nob.) Single ♂ specimen. **E. villosa.**
Body yellow, 8

8. Wings immaculate, slightly yellowish cinereous; veins pale, hairs of moderate length; palpi and antennæ brown; the first 3 or 4 joints of the flagellum pale; (the two basal joints of the antenna are generally infuscated, especially the tip of the second;) thorax of a saturate reddish yellow on the back, paler, almost sulphureous on the shoulders; pleuræ pale, slightly hoary; tips of the tarsi and of the horny parts of the ♂ forceps brown; lin. 2½—2½ long, common; Washington D. C. Florida, (nob.) Wisconsin, (Mr. Kennicott.) **E. vespertina.**
Wings yellowish, with two brown dots on the anterior margin; (one across the stigmatical cross-vein; the other at the tip of the subcostal vein;) veins pale yellow, infuscated at all their tips and anastomoses, cross-veins infuscated; great cross-vein nearer to the base of the wing, than the other central cross-vein; *a fringe of golden yellow hairs at the tip of the wing;* feet brown, clothed with brown hairs; base of femora yellow, which color extends nearly to the tip of the posterior femora; antennæ of the ♂ clothed with a dense pubescence, besides the verticils; length lin. 2—2½. Washington, D. C. three ♂ spec. (nob.) **E. chrysobomba.**

9. Surface of the wing naked, the veins alone being hairy. 10
Whole surface of the wing pubescent; *a brown spot in the region of the stigma;* indistinct nebulosities on the central cross-veins; upper branch of the lower fork straight; lower branch arcuated, almost angular near its origin; great cross-veins a little nearer to the base of the wing than the other central cross-veins; body cinereous; antennæ brown; those of the ♂ densely pubescent besides the verticils; stem of the halteres dusky; the latter part of the knob pale yellow; feet blackish tawny, pale at base, knees pale. length lin. 2–2½. Middle States, eight specimens ♂ ♀, (nob.) **E. Melgenii.**

10. Wings fuscous, with numerous round, white spots on the surface, and six large square spots of the same color along the anterior margin; thorax with two fuscous lines above and one on each side, before the wings; femora

with two blackish rings; length 1¼–2½ lines. Common in the United States; occurs also in Cuba.—Say, Journ. Acad. Philada. iii. 17.

E. calliptera, *Say*.

Wings hyaline, slightly cinereous; about *ten* brown spots along the margins of the wing, at the tips of the longitudinal veins; the spots along the anterior margin are larger; cross-veins infuscated; thorax yellow, with two brown stripes; similar stripes on the pleuræ; feet pale, with a brown ring before the tip of the femora; abdomen brown; length 1–1½ lines. Washington, D. C.; Savannah, Ga. Ten ♂ ♀ specimens (nob.) **E. parva.**

11. Surface of the wing naked, the veins alone being hairy. 12

Whole surface of the wing hairy; body cinereous; a brown stripe over the thorax; antennæ fuscous, paler at the base of flagellum; verticils short; palpi black; halteres pale, slightly infuscated at the base of the knob the tip of which is clothed with a short, golden yellow pubescence; feet dark tawny, paler at base of femora, brown at tip of tarsi; brown ring before the tip of femora; knees whitish; wings greyish-white, with grey nebulosities; they form two more or less marked bands across the apical areolets; a third band passes over the cross-veins; there is one nebula in the centre of the præbrachial area; another in the axillary, and some nebulosities in the subaxillary area; length 2¼–2¾ lin. Washington, D. C., common in April; on the 15th of this month I caught several pairs *in copulâ*. **E. nubila.**

12. Wings with numerous brown spots. 13

Wings pale yellowish with two brown bands; the first begins at the origin of the petiole, is broadest in the middle, and reaches the posterior margin at the tip of the axillary veins; the other is parallel, runs from the anterior to the posterior margin, and includes at each end a small transparent spot; sometimes the spot at the anterior margin is connected with the yellow of the apical part of the wing; in this case a brown spot at the tip of the subcostal vein is isolated from the band; second lower discal cross-vein slightly colored; small brown dots at the tips of the upper branch of the radial fork and of both branches of the lower fork; body brown; thorax yellow; pleuræ brown; feet and halteres pale; femora with brown rings; length, lin. 2¼–2½. Trenton Falls, N. Y., and Virginia Springs (nob.); Connecticut (Mr. Norton); 12 ♂ ♀ specimens. **E. venusta.**

13. Feet pale; thorax cinereous, without stripes; abdomen fuscous; posterior margins of segments pale; five or six brown spots at the anterior margin of the wing; the second spot from the base does not touch this margin; tips of all the veins along the posterior margin clouded with brown; there is a nebulosity in the subaxillary area; cross-veins clouded; great cross-vein nearer to the base of the wing than the other central cross-veins; *the second externomedial vein is prolonged in the shape of a stump, inside of the discal areolet*; sometimes this stump reaches the opposite side of the areolet, and thus divides it in two; length, lin. 2¼–2½. Washington in the Spring (nob.); Wisconsin (Mr. Ulke); 16 ♂ and ♀ specimens. **E. armata.**

Feet variegated with brown, which forms two broad rings on the anterior femora, occupying the whole surface; posterior femora brown, with a pale ring before the tip; tips of tibiæ and tarsi brown; thorax yellowish cinereous, a brown, capillary often indistinct stripe on the præscutum; a broad, dark brown stripe reaches from the humeri to the metathorax, passing inside of the base of the wing; a similar stripe on the pleuræ; abdomen brown; halteres pale; antennæ brown, with pale base; (those of the ♂ densely clothed with a short pubescence); palpi brown; tips of the longitudinal veins, cross-veins, etc., clouded; costal vein infuscated at six intervals, especially opposite the petiole, where a spot occurs, one branch of which nearly reaches the præbrachial vein; pobrachial vein infuscated and clouded *twice* before the great cross-vein, which is arcuated and nearer to the base of the wing than the other central nervures; some

indistinct nebulosities in the axillary and subaxillary area; veins yellow, except where the clouds and spots occur; length lin. 2½–2¾. Washington, D. C. Common. **E. graphica.**

14. The forked externomedial vein originates from the great cross-vein (see the figure in Curtis' Brit. Ins. tab. 557). 15

The forked externomedial vein originates *beyond the great crossvein*, that is, from the præbrachial vein; greyish black, the body, the veins and the posterior margin of the wings covered with long, black hairs, which appear golden in a certain light; halteres, antennæ and feet black; the second radial area is square at its base, the basal cross-vein being in a line with the stigmatical cross-vein; the cubital and subcubital areæ are likewise square at their base, of equal length and but little shorter than the second radial; (the veins can be seen only when the pubescence is rubbed off; length lin. ¾. Washington, D. C., and Relay House, near Baltimore (nob.), 10 ♂ specimens; forms clouds in the Spring in the vicinity of running waters; perhaps synonymous with the European *E. murina Meig?* **E. urabrit.**

15. Body brown; wings dusky; veins very hirsute with brown hairs; pale spots at humeri; halteres infuscated; fect fuscous; coxæ and base of femora pale; antennæ brown; length lin. 2–2½. Three ♀ from Maryland (nob.). **E. hirtipennis.**

Body yellow; front and margin round the thorax sulphur yellow; the latter, if viewed in a certain light has a hoary reflection; palpi brown; antennæ pale, brown at tip; halteres sulphur yellow; anterior feet tawny, clothed with brown hairs; the two other pairs yellow, with brown tarsi and tips of tibiæ; wings and their veins pale yellowish; veins thickly hairy; a fringe of golden hairs along the anterior margin and round the tip; long 2 lin. Washington, D. C., eight ♀ specimens. **E. pubipennis.**

SYMPLECTA Meig.

The distinguishing character of this genus is *the undulating axillary vein. The absence of spurs* at the tip of the tibiæ seems to indicate a relationship to Eriöptera; at the same time it is a ground for separation from Limnophila, Anisomera, etc.

The ♂ forceps consists of two subcylindrical, coriaceous pieces with two stout horny appendages attached to each of them (fig. 29, forceps of S. punctipennis; the ♀ ovipositor shows some analogy to that of Gnophomyia in the shortness of the *lower valves; besides the ovipositor is armed on the upper side at the base with two small teeth.* This character, first noticed by Schummel in S. punctipennis, &c., belongs also to several ♀ Eriopteræ.

For details about this genus, I refer to Meigen, Walker, Zetterstedt, etc.

Judging from the description of the European S. punctipennis *Meig.* it would seem that the specimens which I caught in America belong to the same species. I describe them, therefore, under the same name.

S. punctipennis. Cinerea, thorace vittis tribus fuscis; alis albicantibus, venulis transversis infuscatis.

Limnobia punctipennis Meig. Eur. Zw. Ins. i. p. 147, tab. v. f. 7.

Symplecta punctipennis l. c. vol. vi. p. 283.

Head cinereous; antennæ and palpi black. Thorax cinereous; hoary on the pleuræ; præscutum with three distinct brown stripes; knob of the halteres infuscated; feet brown, paler at the base. Tergum blackish; venter cinereous; ♀ genitals pale. Wings whitish cinereous; cross-veins, base of petiole, etc., clouded; neuration exactly like Meig. i. tab. v. f. 7.

Common in the spring and autumn; occurs even frequently in winter. Washington, D. C. Mobile, Ala., (nob.) Illinois, (Mr. Kennicott.)

Compared 12 ♂ specimens. The supplementary cross-vein in the second radial area is sometimes wanting; the same is the case with the first lower discal cross-vein.

[Aug.

CLADURA nob.

Proboscis and palpi short; last joint of the latter very stout. Front and vertex convex. Eyes almost contiguous on the under side of the head. Antennæ 16-jointed, of moderate length (reaching the base of the wings); first joint cylindrical, second turbinated, the following joints subcylindrical, elongated, slightly incrassated at the base, with moderate verticils. Feet long, moderately stout, tibiæ without spurs at the tip. Ungues small, smooth. Pulvilli distinct. Wings long, neuration like Limnophila, with two radial areæ and one petiolate areolet. Veins with a short, but distinct, pubescence on the apical portion of the wing. Genitals of the ♂ large, stouter than the abdomen; the upper side of the last abdominal segment is horny, convex, having a notch between two projecting points on the posterior margin; the forceps, which are inserted below, are large, with a long, cylindrical basal joint. (See fig. 34; this sketch is drawn from a dry specimen, and might not perhaps be altogether correct.) Ovipositor of the ♀ of the usual structure; the upper valves are flattened, lamelliform towards the tip.

In general appearance this genus is very like Limnophila, but it may be distinguished at once *by the absence of spurs on the tibiæ*. It has this character, as well as the slight pubescence on the veins of the wing, in common with Eriopter a; but its long feet and elongated wings give Cladura an altogether different appearance. By its eyes, contiguous below, it reminds of Symplecta. In the structure of the ♂ genitals it differs from all other genera of the group.

C. flavoferruginea. Flavo-ferruginea, præscuto nitido; pleuræ punctis, abdomen fasciis brunneis; alæ flavescentes, venulis transversalibus infuscatis; long. lin. 3—3½.

Proboscis, palpi and antennæ pale ferrugineous; the two latter infuscated at the tip. Præscutum ferruginous, shining; a more or less apparent dark line in the middle; a brown spot on the humerus; pleuræ pale yellow; two brown spots between the humerus and the base of the wing; a third one lower, about the middle of the pleuræ; scutellum and metathorax ferruginous; a small black dot on each side, between the latter and the base of halteres; these are pale: feet hairy, yellowish ferruginous; tips of femora, tibiæ and tarsi brown. Tergum ferruginous; lateral margins of segments brown, united by a pale brown band running across the middle of each segment; venter yellow; genitals ferruginous, shining. Wings yellowish; costal, subcostal and pobrachial veins ferruginous; other veins brown; cross-veins and origin of petiole clouded with brown; stigma pale; *a supplementary cross-vein about the middle of the cubital area.*

Washington, D. C. October, November, (nob.)

Compared seven ♂ and ♀ specimens.

In one of my specimens, there is a second supplementary cross-vein in the *second radial area* on one wing, and *in the subapical* on the other.

Besides the seven specimens described above, I have three from Massachusetts (sent by Mr. Scudder), distinguished from the above described specimens *by the absence of the supplementary cross-vein* in the cubital area. These three specimens are smaller in size, and the cross-veins of the wing are scarcely clouded. I doubt whether they belong to a different species, but still it is very remarkable that all came from the same locality. In the mean time I have abstained on their account from mentioning that supplementary cross-vein among the characters of the genus as well as in the diagnosis of the species.

GONOMYIA Meig.

Proboscis and palpi short; the joints of the latter nearly equal length. Antennæ 16-jointed, of moderate length (not reaching the base of the wing.) Feet long, slender; *tibiæ without spurs at tip;* ungues small; pulvilli distinct. Wings

(like Meig. i. tab. vii. f. 7,) of moderate length; naked, with two radial and no petiolate areæ. *The second radial area is very short, taking its origin about the middle of the cubital; the upper branch of the radial fork runs obliquely towards the anterior margin;* mediastinal vein short, joining the costal nearly opposite the origin of the petiole; discal areolet extant or wanting; stigmatical cross-vein wanting. Forceps of the ♂ (fig. 16 and 17, G. blanda and G. cognatella,) consists of two moveable basal pieces, with four elongated appendages attached to each of them; these appendages are clothed with hairs or bristles, and armed with spines. Ovipositor of the ♀ moderately long, consisting, as usual of two pairs of valves; the upper pair long, arcuated.

The peculiarities of this genus consist, chiefly, in the neuration of the wing, the structure of the ♂ forceps and *the coloring, in which the sulphur-yellow prevails.*

It is not easy to find for Gonomyia an appropriate location in the system; it stands as an isolated, sharply defined group, bearing no apparent affinity to any other group of the family. The number of joints of its antennæ, the smooth ungues, the distinct pulvilli, and the presence of the second, although almost rudimental, radial area, determined me to locate it, provisionally, in the same group with Eriioptera.

The European Limnobia tenella *Meig.* belongs to this genus. It was sent to Meigen by Megerle under the name of Gonomyia tenella (conf. Meigen, vol. I. p. 146). Mr. Stephens, in his Catalogue of British Insects, (1829), and Mr. Curtis, in his "Guide," (1837), have again applied this generic name to this species, but without defining the genus.

Analytical Table.

1. Wings spotted,	G. blanda.
Wings not spotted,	2
2. Femora with a distinct brown ring at the tip; knob of halteres lemon-yellow,	G. sulphurella.
Femora without brown rings at the tip,	3
3. Antennæ orange at the base,	G. cognatella.
Antennæ entirely black,	G. subcinerea.

G. sulphurella. Sulphureo-flava, fusco-maculata; *antennis basi aurantiacis, in ♂ verticillis longis;* femoribus annulo fusco; areola discoidali (in specimiribus typicis) clausa; long. lin. 2—2⅓.

Front and vertex sulphur-yellow, infuscated in the middle; proboscis, palpi and antennæ brown; basal joints of the latter bright orange; flagellum of the ♂ incrassated at the base and slender beyond it, with long, feathery verticils; that of the ♀ filiform with short verticils. Collare sulphur, yellow; præscutum and scutum light brown, yellow on the margins; scutellum yellow with a brown line in the middle; metathorax yellowish, infuscated in the middle; pleuræ yellow along the margins of the præscutum; a yellow stripe, margined with brown, runs from the fore coxæ backwards; halteres yellow; knob lemon-yellow; coxæ pale yellow, with a brown ring at the tip; femora slightly incrassated at the tip, with a yellow ring beyond the middle and a brown ring near the tip, which is yellow; anterior pair of femora darker, their tip brown; tibiæ tawny, infuscated at tip; tarsi fuscous. Abdomen of the ♂ lemon-yellow; base of the segments brown, genitals yellow; abdomen of the ♀ brownish; posterior margins of the segments of the tergum yellow; genitals ferruginous. Wings slightly gray, pale at the base, stigma pale; oblique vein very short, almost perpendicular. (Conf. Schummel, l. c. tab. ii. f. 2.) The discal areolet is closed in the normal specimens; among 16 ♂ and ♀ specimens which I have before me, it is open in a single one only.

Washington, Trenton Falls, etc. Spring and Summer (nob.)

G. cognatella. Sulphureo-flava, fusco maculata, *antennis basi aurau-*

tiscis, in ♂ dense pubescentibus, verticillis brevibus; *pedibus unicoloribus*; areola discoidali aperta; long. lin. 2—2½.

Very like the preceding, but easily distinguished by the following characters: 1st. The antennæ of the ♂ are covered on every joint with a short, dense pubescence, which, being interrupted at the articulations, makes the antennæ appear moniliform; 2d. The halteres (both stem and knob) are infuscated; 3d. The pluræ are yellow, with a brown stripe; 4th. The feet are uniformly pale tawny; only the tips of the tarsi darker; 5th. The upper branch of the radial fork is more oblique and therefore longer; 6th. The discal areolet is open (at least in the normal specimens;) 7th. The forceps of the ♂ has a different structure.

Five ♂ and two ♀ specimens; Washington (nob.)

G. subcinerea. Sulphureo-flava, thoracis disco cinereo-fusco, *antennis nigris*; pedibus unicoloribus; long. lin. 2½—2¾.

Very like G. cognatella, but easily recognizable by the following characters: the pleuræ are yellow; the brown parts of the thorax have a peculiar greyish tinge; the antennæ are uniformly black; those of the ♂ have moderately long verticils, the pubescence is not so distinct; the discal areolet (in the normal specimens) is closed; the halteres are very slightly infuscated.

Twelve ♂ and ♀ specimens; the discal areolet of one of them is open. Washington, Trenton Falls, etc. (nob.)

This species seems to resemble Limnobia shistacea *Schum.* (l. c. p. 146), but the upper branch of its radial fork is more oblique and arcuated than that of the latter species, judging from Schummel's figure.

G. blanda. Flavo-variegata; alæ stigmate et marginis anterioris parte apicali fuscis; venulis transversis infuscatis; long. lin. 2½—2¾.

Proboscis cinereous, margined with yellow on the upper side; front and vertex cinereous, margined with yellow along the eyes; antennæ brown; two basal joints yellow. Præscutum pale cinereous, with two approximated brownish stripes in the middle; lateral stripes hardly distinct; scutum, scutellum and metathorax yellowish cinereous, marked with brownish spots; pluræ pale yellow, slightly hoary; halteres dusky, with dark knobs; feet pale, tips of femora, tibiæ and tarsi infuscated. Tergum brownish cinereous; lateral and posterior margins of the segments yellow; venter sulphur yellow; ♂ forceps yellow with black appendages; ♀ ovipositor ferruginous. Wings with clouded cross-veins and black dots at the anastomoses of the veins; the stigma and the portion of the anterior margin between the stigma and the tip are blackish; in some specimens there is a short stump of a vein near the origin of the petiole.

Four ♂ and ♀ specimens; Washington, Trenton Falls (nob.)

LIMNOPHILA nob.

Two radial areæ; mediastinal cross-vein near the tip of the mediastinal vein, and always posterior to the origin of petiole; petiolated areolet in most cases extant; sometimes wanting; (in the first case the neuration is more or less like Meig. i. tab. iv. f. 20, or tab. vi. f. 2; in the second like Meig. v. f. 4.); antennæ 16-jointed;* palpi much shorter than the head; joints nearly of the same length; (except in L. macrocera Say, the palpi of which are nearly as long as the head, the last joint being elongated); proboscis short; labrum transverse; tibiæ armed with spurs at the tip; pulvilli distinct; ungues smooth; forceps of the ♂ consisting of two cylindrical or suboylindrical basal pieces, with two coriaceous or horny, generally falciform appendages attached to them. (Fig. 24, 25, 26, 27, 28.)

*Except in the 12th section, which has been temporarily located in this genus, and in which the antennæ are apparently 17-jointed.

The various forms, contained in the group thus characterised, may be arranged into several natural groups of lower order, most of which will be erected at some time into new genera. Those among them offering characters which require an immediate separation, have been supplied with generic names; but as long as the whole group is not subdivided into genera of an equal systematic value, it is preferable to leave all its subdivisions under a common generic appellation.

Limnophila in its present definition comprises all the species which Macquart would have located in his genus Limnophila; but it contains besides those, species with *two radial areæ, but without petiolate areolet* which, in Macquart's distribution, belonged to his genus Limnobia; (compare what has been said about it in the introduction.)

Analytical table.

1. A supplementary cross-vein in the subcostal area, about the *middle of the anterior margin.* (Sect. 7. Subgenus Epiphragma *nob.*) 2
   A supplementary cross-vein *at the tip of the second radial area.* (Sec. 10. Dicranophragma.)
   Antennæ pale at base, thorax cinereous, with brown spots, feet pale, wings spotted with brown; 2¼—3 lin. long. **L. fuscovaria *nob.***
   A supplementary cross-vein in the pobrachial areolet, 3
   No supplementary cross-veins, 4
2. Wings variegated with brown and tawny bands and spots, but without ocelliform spots; body pale brown; thorax pale sericeous behind the wings; feet tawny; femora with a brown ring before the tip; lin. long 4½. **L. solatrix *nob.***
   Wings variegated with brown ocelliform spots; long. lin. 4½, **L. pavonina *nob.***
3. Antennæ of the ♂ longer than head and thorax together; ♀ with rudimentary wings. (Sect. 2; subgenus Idioptera *Macq.*) Wings with two brown bands and several brown spots; head and thorax cinereous; abdomen yellow, with brown margins; long. lin. 3, **L. fasciata *Lin.***
   Antennæ of the ♂ hardly reaching the base of the wings; joints of the flagellum subglobular; cinereous, with brown feet; wings with 7 or 8 brown spots along the anterior margin; lin. 2½. (Sect. 3,) **L. aprilina *nob.***
4. Petiolate areolet extant (that is, *four* externomedial areolets,) 5
   Petiolate areolet wanting (that is *three* externomedial areolets,) 15
5. Wings with large brown spots along the anterior margin and the central cross-veins, 6
   Wings altogether without spots or with a brown stigma and nebulosities on the cross-veins only, 7
6. Body black, shining; antennæ of the ♂ as long as the body, or a little longer, slender, filiform; clothed with soft, erect hairs; those of the ♀ setaceous, not reaching beyond the base of the wing; feet brown, femora ferruginous with brown tip; long. lin. 3—4. (Sect. 1. Subg. Lasiomastix *nob.*) **L. macrocera *Say.***
   Body cinereous; antennæ of ♂ and ♀ short; thorax with four brown stripes; feet dark tawny, with brown tips; long. lin. 3¼—4. (Section 9th. Subg. Dactylolabis *nob.*) **L. montana *nob.***
7. Cubital area considerably longer than the subapical, its base being so much nearer to the base of the wing; wings infuscated, cross-veins clouded; thorax cinereous, abdomen dark tawny; long. lin. 3—3½. (Section 5th,) **L. lutelpennis *nob.***
   Cubital area of equal length with the subapical, or not much longer, the base of both being nearly equidistant from the base of the wing, 8
8. Thorax cinereous,

Thorax ochraceous, yellow or brown, 11

9. Thorax with four distinct brown stripes, the intermediate ones approximated; antennæ and feet fuscous; wings hyaline, stigma pale; the third, fourth, fifth and sixth joints of the antennæ almost coalescent; long. lin. 2¾—3¼. (Section 6th,) L. ultima *nob.*

Stripes of the thorax indistinct, 10

10. Petiolate areolet unusually short, almost rudimental; wings hyaline, slightly subcinereous; stigma pale; body brown, thorax subcinereous; long. lin. 2¾, (Section 5th,) L. brevifurca *nob.*

Petiolate areolet longer or not much shorter than the petiole; body dark cinereous; wings yellowish or infuscated; stigma fuscous; base of femora ferruginous; long. lin. 4—5. (Section 8th. Prionolabis *nob.*) L. rufibasis *nob.*

11. Mediastinal cross-vein close by the tip of the mediastinal vein; the discal areolet has the usual proportions, 12

Mediastinal cross-vein removed from the tip of the mediastinal veins at a distance about equal to the length of the great cross-vein; discal areolet elongated, about twice as long as in the other species of the genus; body pale yellow; wings hyaline, stigma pale; long. lin. 2¾—3¼, (Section 5th,) L. areolata *nob.*

12. Thorax shining, 13

Thorax not shining, body brownish yellow; wings hyaline, with a pale stigma, 14

13. Body and feet yellowish ferruginous; wings slightly infuscated at tip; stigma pale fuscous; stigmatical cross-vein beyond the origin of the radial fork; long. lin. 3½—4, (Section 5th,) L. adusta *nob.*

Body brown, pleuræ yellow; wings infuscated; stigmatical cross-vein close by the origin of the radial fork; antennæ of the ♂ longer than head and thorax together; long. lin. 3—4, (Section 4th,) L. tenuipes *Say.*

14. The petiole forms an almost straight line with the *radial vein;* long. lin. 3¼—4, (Section 5th,) L. imbecilla *nob.*

The petiole forms an almost straight line with the *cubital vein;* radial vein conspicuously arcuated before its forking; long. lin. 3—3½, (Section 5th,) L. toxoneura *nob.*

15. Wings pubescent on the whole surface; body brown; long. lin. 3½, (Section 12th,) L. pilosella *nob.*

Wings not pubescent, 16

16. Cinereous, with pale ferruginous feet and brown tips of femora, tibiæ and tarsi; long. lin. 2¾—3¼, (Section 11th,) L. quadrata *nob.*

Pale yellow, stigma pale; long. lin. 2¾—3¼. (Section 11th,) L. lenta *nob.*

1st Section.

(Subgenus Lasiomastix nob.)

Antennæ of the ♂ *as long or a little longer than the body,* slender, *filiform;* two basal joints short, the following elongated, cylindrical, of nearly equal length, clothed with soft, erect hairs; the third and fourth joints have a small spine on the under side, at the tip; antennæ of the ♀ *setaceous, not reaching much beyond the base of the wing;* joints cylindrical, clothed with sparse hairs.* Palpi a little longer than the head; *last joint longer than the preceding.* Wings somewhat like Meig. i. tab. vi. f. 3. Forceps of the male like the typical Limnophilæ; upper horny falciform appendage slender and jointed; lower one short, stout, with the point turned upwards.

* It is difficult to count the number of joints of the ♂ antennæ, even in fresh specimens, although in judging from analogy, it is extremely probable that there are 16. One of the ♀ has apparently but 15 joints.

L. macrocera. Nigra, nitida; femoribus flavo-ferrugineis, apice fusco; alis fusco-maculatis; long. lin. 3–4.

Limnobia macrocera Say, Jour. Acad. Phil. iii. p. 20, 2.

Antennæ black, except the basal joints, which are tawny; proboscis and palpi black; front above the antennæ and lower part of the head yellowish-ferruginous; vertex black, shining. Thorax black, shining; pleuræ slightly hoary; halteres pale yellow, (the ♀ specimen have a brown knob); feet dark tawny; coxæ and base of femora paler; tips of femora, tibiæ and tarsi brown. Abdomen black; three or four intermediate segments with pale ferruginous spots at the base (more distinct in living specimens); genitals ferruginous-yellow. Wings hyaline, spotted with brown; one spot near the base, in the angle between the subcostal and pobrachial veins; another square one, near the origin of the petiole, between the same veins; a third one between the costa and the discal areolet; the tip of the wing, as well as the discal cross-veins, are clouded. In some specimens (for instance in my ♂ from Florida,) a nebulosity extends along the pobrachial, anal and axillary veins; it occupies the whole extent of the areæ between these veins; the nebulosity at the tip of the wing has, in such cases, also a greater extension. The neuration is like Meig. i. tab. vi. f. 3, only the second radial and cubital areæ are nearly of the same length, the radial vein forking immediately beyond its origin.

I found ♂ specimens quite commonly on the 2d of July, 1859, near the so-called *Salt-pond* in southern Virginia, (about 20 miles from the Montgomery White Sulphur Springs.) Another ♂ specimen I caught in Florida, in March, 1858. Of my three ♀ specimens I found two near Washington, and received one from Dr. Asa Fitch, of Salem, N. Y. There is a very strong probability that these ♀ belong to the same species; but having never found both sexes *in the same locality*, I cannot affirm it positively.

N. B. Say commits a mistake when he compares the neuration to Meig. i. tab. v. f. 7. Wiedemann quotes correctly Meig. i. tab. vi. f. 3.

2d Section.

(Subgenus Idioptera Macquart.)

Wings like Meigen i. tab. iv. f. 16, or Schumm. tab. iv. f. 4. *Pobrachial areolet divided in two sections by a supplementary cross-vein in its middle.* Antennæ of the ♂ longer than head and thorax together, with elongated subcylindrical, densely pubescent joints; two basal joints short.

The ♀ of the European L. fasciata has rudimental wings and cannot fly. (Figured in Schum. tab. v, f. 2.)

A ♂ specimen from Massachusetts, for which I am indebted to Mr. Scudder, in Boston, corresponds pretty closely to Schummel's description of L. fasciata.

L. fasciata. Capite thoraceque cinerascentibus, abdomino silaceo, fusco-marginato et fasciato, alis hyalinis, fasciis duabus, maculisque pluribus fuscis; length 3 lin.

Limnobia fasciata (Linn.?) Schummel, Limnob. p. 183.

Head brownish cinereous: palpi and antennæ black. Thorax cinereous, pleuræ and metathorax hoary; scutellum pale; halteres tawny, with brown knob; feet brown; coxæ and base of femora pale ochreous. Abdomen ochraceous, lateral and posterior margins of the segments brown; ♂ forceps tawny. Wings hyaline, with two bands formed of brown spots; a spot at the tip and several small dots between it and the second band.

3d Section.

Neuration of the wing like 2d Section, (Meig. i. tab. iv. f. 16,) *a supplementary cross-vein dividing the pobrachial areolet in two sections.* Antennæ hardly reaching beyond the origin of the wing; joints of the flagellum subglobular.

L. aprilina. Cinerea, pedibus subfuscis; basi pallidis; alis ad costam 6 vel 7 maculatis; venis transversis, nebulosis; long. lin. 2½.

Head cinereous; palpi black; antennæ clothed (in the ♂) with a dense pubescence, dark tawny; two basal joints brown. Thorax cinereous; præscutum yellowish, with indistinct stripes, the intermediate one capillary; halteres pale; feet dark tawny, coxæ and base of femora pale. Abdomen cinereous; the horny appendages of the ♂ forceps short, stout and obtuse; one of them with a deep notch at the tip, (fig. 25 and 25*a*.) Wings with seven brown spots along the anterior margin; the first near the base; the third is sometimes connected with a nebulosity on the supplementary cross-vein and with a large round spot at the tip of the axillary vein; the fourth is sometimes connected with a nebulosity along the central cross-veins; the fifth situated at the tip of the subcostal vein is the largest of all, and nearly square; the sixth and seventh are at the tips of both branches of the radial vein; the other veins have likewise small spots at their tips; the great cross-vein is clouded, as well as the other cross-veins; base of the wing, subcostal and pobrachial veins, yellow.

Two ♂ specimens. Washington, in April, (nob.)

4th Section.

Wings like Meig. i. tab. vi. f. 2, elongated, narrow. *Antennæ of the ♂ much longer than head and thorax together, filiform; joints subcylindrical, elongated*, clothed with a short, dense pubescence, and with moderately long verticils; antennæ of the ♀ a little shorter than those of the ♂; pubescence indistinct, but verticils long.

This section is allied to Section 2d (Idioptera) by the structure of the ♂ antennæ, and to Section 5th by the neuration of the wings and the whole *habitus* of the body.

L. tenuipes. Brunnea, humeris, pleurisque silaceis; alis infuscatis; long. lin. 3—4.

Limnobia tenuipes Say, Jour. Acad., Phil. iii. p. 21, 3.

L. humeralis Wied., Auss. Zw. i. p. 38, (not *L. humeralis* Say.)

Proboscis ochraceous; palpi black; antennæ black, base paler, front black, with a cinereous reflection. Thorax ochraceous, præscutum shining, more or less brown in the middle; scutum, scutellum and metathorax also brown in the middle; halteres infuscated at tip; feet dark tawny, pale at base; coxæ ochraceous. Tergum brownish, venter paler. Wings with a brownish tinge, stigma elongated, brown, sometimes very pale; neuration exactly like Meig. i. tab. vi. f. 2.

Twelve ♂ and ♀ specimens from Washington, in June, and Savannah, Ga., in April, (nob.)

N. B.—Say's descriptions of L. tenuipes and L. humeralis are so much alike that the choice between them was somewhat difficult in identifying the present species. Still the words in the description of L. tenuipes "antennæ long," and "wings dusky" determined my choice. Wiedemann took both for synonyms; but Say denies this synonymy in a manuscript note, which still exists in a copy of Wiedemann's work, which he had used.

5th Section.

(Typical Limnophilæ.)

Neuration of the wings like Meig. i. tab. iv. f. 20, and tab. vi. f. 2 or 3; no supplementary cross-veins; antennæ hardly reaching or not reaching much beyond the base of the wings; basal joint cylindrical, elongated; the second short; joints of the flagellum subcylindrical or elliptical, with moderate, sometimes long, verticils. Feet long, moderately slender.

L. adusta. Ferrugineo-flava, fronte cinerea, thorace nitido, alis flavescentibus, ad apicem infuscatis, stigmate fusco; long. lin. 3½—4.

Head yellow, palpi infuscated, antennæ yellow, infuscated at tip, front cinereous. Thorax yellowish ferruginous, shining; a narrow brown line in the middle of the præscutum; halteres yellow, knob infuscated; feet ferruginous yellow, tips of tarsi brown. Abdomen yellow. Wings yellowish, infuscated at the tip (especially between the stigma and the subapical areolet); origin of the petiole and central cross-veins slightly clouded; subcostal and mediastinal areæ tinged with yellow; stigma oblong, fuscous; the costal, subcostal, mediastinal, præscutum and pobrachial veins yellow; the veins and cross-veins on the apical portion of the wing brown; the stigmatical cross-vein is near the tip of the subcostal vein, at some distance beyond the origin of the radial fork; cubital area considerably longer than the second radial one and a little longer than the subapical.

Three ♂ and two ♀ specimens. Trenton Falls and Northern Illinois, (neb.) Upper Wisconsin River, (Mr. Ulke), Maine, (Mr. Packard). The specimen from Maine, although undoubtedly belonging to the same species, is distinguished by a darker coloring of the wing; the veins are brown; the fuscous tinge at the tip is more intense and extends much farther along the posterior margin; the pobrachial vein is infuscated; the nebulæ at the central cross-veins and at the origin of the petiole are darker. In some specimens the stigma as well as the infuscated tip of the wing are very pale brown.

L. luteipennis. Antennis fuscis, thorace cinereo, linea media fusca; pleuris canescentibus; abdomine pallide fusco; alis infuscatis, venis transversis nebulosis; long. lin. 3—3½.

Front and vertex cinereous; proboscis and palpi brown; antennæ brown; upper side of first joint cinereous; base of third pale. Præscutum brownish cinereous; intermediate stripe double, but more or less obsolete; a longitudinal brown line in its middle always distinct; indications of the lateral stripes near the suture and on the scutum; the latter and metathorax brownish cinereous; scutellum reddish, with a brown line in the middle; pleuræ bluish hoary; halteres pale, with dusky knob; feet tawny; tip of femora and of tibiæ and tarsi more or less infuscated. Tergum tawny; venter paler; male forceps having one of the falciform appendages ciliated. (Fig. 24.) Wings infuscated; all cross-veins, origin of petiole, base of petiolated areolet and tips of anal and axillary veins, clouded; subcostal vein ferruginous; other veins dark brown. Cubital area a little longer than the subapical. The proportion between the length of the petiolated areolet and its petiole is not constant; generally, the areolet is a little longer, although sometimes it is shorter than the petiole. In one of my specimens the areolet is more than twice shorter than its petiole on one wing, and it is altogether wanting in the other. A stump of a vein near the origin of the petiole.

Common at Washington from the earliest Spring through the greatest part of the Summer. I observed them swarming and copulating on the 19th of April, 1859, just before sunset, and caught them also in July. Florida, (in March, 1858.) Massachusetts, (Mr. Scudder.)

Compared eight ♂ and seven ♀ specimens.

L. toxoneura. Fusco silacea, antennis fuscis; alis subhyalinis, stigmate pallido; *vena radiali* (ante furcam), *conspicue arcuata;* long. lin. 3—3½.

Front cinereous; palpi infuscated; proboscis yellow; antennæ brown; base of third joint pale. Thorax brownish yellow, with two pale brown stripes, which are very distinct on, and before, the scutum, and paler near the collare, where they communicate with a brown spot near the humerus; pleuræ pale, sometimes with a pale brown stripe; halteres pale, slightly infuscated; feet pale tawny, tips slightly infuscated. Abdomen tawny, lateral margins brown. Wings pale cinereous; stigma pale; *the petiole forms a line nearly straight with the cubital vein*, (and not with the *radial vein*, as is frequently the case in other species): the portion of the cubital vein anterior to the central cross-vein is

short and but slightly oblique; *radial vein conspicuously arcuated* before its forking, (hence the name of the species.)

One ♂ and five ♀. Trenton Falls, (nob.)

L. imbecilla. Fusco-silacea, thorace unicolore, antennis fuscis, basi flagelli pallida, verticillis longis; *petiolus longus, venæ radiali longitudine æquus;* long. lin. 3¼—4.

Front cinereous, palpi infuscated, antennæ brownish, pale at the base of the flagellum, with long verticils. Thorax brownish yellow; pleuræ and metathorax slightly hoary; halteres pale, slightly infuscated; feet pale tawny; tips of tarsi brown. Abdomen tawny; tip pale; ♀ ovipositor long. Wings pale cinereous, stigma more or less pale fuscous; petiole about as long as the radial vein, forming a straight line with the portion of this vein which is anterior to the fork; the stigmatical cross-vein is beyond the middle of the stigma, very near the origin of the radial fork and about the middle of the distance between the tip of the costal vein and the anterior end of the stigma; the central cross-vein forms a straight line with the cross-vein, separating the cubital area from the præbrachial, (which cross-vein is, in fact, the anterior portion of the cubital vein.)

Four ♂ and seven ♀ specimens. Trenton Falls, N. Y., Virginia and Georgia, (nob.) Illinois, (Mr. Kennicott.)

This species is very like L. toxoneura in its coloring, but is easily distinguished by the different neuration of the wing.

The thorax of the normal specimens is *not shining;* the front is slightly cinereous; but among the specimens which I collected in Georgia there are two or three with a shining thorax and a brownish yellow front. They agree in all other characters, and I hardly think that they form a distinct species.

L. brevifurca. Fusca, thorace cinerascente, alis subcinereis, areola petiolata brevissima; long. lin. 2¾.

Head cinereous; antennæ and palpi fuscous. Thorax cinereous, slightly yellowish on the præscutum; an obsolete, pale brown, double stripe along its middle; halteres pale at base; knob slightly infuscated; feet moderately hairy, dark tawny, slightly infuscated at the tips of the femora and tarsi; coxæ and base of femora pale. Abdomen brownish; ♂ forceps pale. Wings subcinereous, stigma slightly infuscated; petiolated areolet from four to six times shorter than its petiole; the radial vein, before its forking, forms a straight line with the petiole; the portion of the cubital vein anterior to the central cross-vein is very short, perpendicular to the radial vein, and in one line with the central and upper discal cross-veins; the mediastinal vein joins the costal very near the stigma; the mediastinal cross-vein is at a short distance from their junction.

Washington, in April, (nob.) Eight ♂ specimens.

L. areolata. Pallide silacea, alis ad basin pallide flavescentibus, tarsorum apice infuscato, area discoidali elongata; long. lin. 2¾—3¼.

Pale ochraceous yellow, antennæ, except the basal joint, slightly infuscated, with moderately long verticils; halteres pale, very slightly dusky; tarsi infuscated, especially at the tip. Wings with a very slight cinereous tinge, yellow at the root; costal, mediastinal and subcostal veins yellow; the other veins brown, with a short pubescence; stigma pale, sometimes very slightly infuscated; the mediastinal cross-vein is removed from the tip of the mediastinal vein at a distance a little longer than the great cross-vein; stigmatical cross-vein in the middle of the stigma and also in the middle between the tip of the subcostal vein and the origin of the radial fork; discal areolet about equal in length to the second externomedial areolet, and about twice as long as in most of the other species of Limnophila.

Thirteen ♂ and ♀ specimens. Trenton Falls in June, and Maryland in May, (nob.)

Some specimens have a short stump of a vein near the origin of the radial fork.

6th Section.

Antennæ short, hardly reaching the basis of the wings; *the four basal joints of the flagellum are short and almost coalescent, forming an elongated, subcylindrical body, which is stouter than the remaining part of the antennæ;* the following joints are subcylindrical, with short verticils. Wings narrow in the ♂, a little broader in the ♀; neuration somewhat like Meig. i. tab. vi. f. 2. Feet slender.

L. ultima. Cinerea, antennis fuscis, thorace vittis quatuor fuscis, intermediis approximatis, pedibus infuscatis, alis pallide cinerascentibus, stigmate pallido; long. 2¾–3¼ lin.

Cinereous, antennæ and palpi brown, first four joints of the flagellum as described above; thorax with four brown stripes, the intermediate approximated, the lateral ones abbreviated before; halteres slightly infuscated at the tip, feet fuscous; coxæ cinereous; trochanter and base of femora pale; ♂ forceps of the same brownish cinereous color as the body; basal joint of forceps long, cylindrical; horny parts elongated, hooked at the tip, (fig. 26.) Ovipositor moderately long, very slightly curved.

Washington, in October, (nob.) Maine, (Mr. Packard.) Six specimens, ♂ and ♀.

7th Section.

(Subg. Epiphragma nob.)

Wings broad, variegated with brown bands, spots, ocelli, etc.; neuration somewhat like Meig. vol. i. tab. iv. f. 20, *but with a supplementary cross-vein in the subcostal area, about the middle of the anterior margin,* (as in Schum. tab. iv. f. 3.) Antennæ not reaching much beyond the base of the wing; 1st. joint cylindrical; 2d short, cyathiform; *3d and 4th coalescent, stout;* the 5th and the following slender, elongated, slightly incrassated at their base, with moderately long verticils on the incrassation.

The European L. picta belongs to this section.

L. solatrix. Brunnea, articulo antennarum tertio flavo, thorace pone alas pallide sericeo, alis fusco et testaceo-pictis. Long. lin. 4½.

Proboscis and palpi brown; basal joints of the antennæ dark cinereous; the second dark brown; the third yellow; the following dusky, darker towards the tip; front and vertex brown, sericeous with yellowish; margins of the eyes paler. Collare brown; præscutum reddish brown, two brown stripes in the middle; lateral stripes abbreviated and indistinct; dark brown spots on the humeri; the posterior margin of the præscutum, as well as the scutum, scutellum and metathorax are yellowish white, sericeous; anterior part of the pleuræ dark brown with some pale and sericeous lines; posterior part sericeous; halteres pale, tip of the knob brown; feet pale tawny clothed with short hairs; coxæ sericeous, with brown in the middle; a brown ring before the tip of the femora. Abdomen pale brown, clothed with short hairs; anterior margin of the segments darker, posterior margin whitish-sericeous; ♀ ovipositor ferruginous. Wings variegated with brown and tawny; the subcostal area contains two angular brown marks, besides the two infuscated cross-veins (humeral and supplementary); a large spot is situated at the base of the wing, between the subcostal vein and the posterior margin; its anterior part is tawny, the rest brown; a brown band begins at the posterior margin, before the tip of the axillary vein; it extends to the præbrachial vein, where it assumes a tawny color and emits two branches; one branch joins a tawny spot in the præbrachial area (between the two angular marks of the subcostal area); the other branch joins a large brown spot which occupies the greater part of

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the first radial area; it emits a tawny branch, which follows the central and great cross-veins; the apical portion of the wing is variegated with several tawny and brown spots, lines and bands.

Washington, in August, (nob.) Compared two ♀ specimens.

L. pavonina. Thoracis disco pallide cervino, basi antennarum fusca; *alis annulis maculisque fuscis.* Long. lin. 4½.

Proboscis and palpi brown; front and vertex yellowish-sericeous; antennæ yellow, first joint brown. Præscutum whitish-yellow with a reddish brown margin; brown spots near the humeri; pleuræ yellowish-sericeous with an indistinct pale brown band; metathorax brownish yellow; halteres pale; base of the knob infuscated; feet yellowish tawny; tips of femora and tarsi brown. Abdomen tawny, infuscated at tip. Wings with yellowish-brown spots and ocelli, the margins of which are darker brown; one incomplete ocellus near the base, between the costal and pobrachial veins; another complete one has the origin of the petiole for its centre, and is connected by an ocelliform spot with several brown spots on the posterior margin; next comes a brown band formed by several imperfect and confluent ocelli and running from the anterior to the posterior margin; this band encloses several pellucid spots, especially in and around the discal areolets; the tip of the wing is occupied by one circular brown spot at the base of the petiolated areolet; another, oblong spot, between it and the anterior margin, and several (five or six) irregular, contiguous spots at the tips of the veins, between the radial and pobrachial; all cross-veins, especially the supplementary cross-vein of the costal area, are infuscated.

Single ♂ specimen from Illinois (Mr. Kennicott.)

8th Section.

(Subgenus Prionolabis nob.)

Body and feet stouter than in the preceding section; the latter hairy. Wings of moderate length and breadth. Neuration somewhat like Meig. vol. i. tab. iv. fig. 20; or Schum. tab. iii. f. 7. Antennæ not reaching the base of the wing; basal joint cylindrical, long; the second short; the following subglobular, elongated towards the tip of the antennæ; *pubescent with short, sparse hairs; no verticils are apparent.* ♂ *forceps with a pair of large, flat, horny appendages, which are serrated on the inside* (fig. 27.) ♀ ovipositor with long, slender, straight valves, which are very slightly arcuated towards the tip.

L. rufibasis. Cinerea, halteribus pallidis, alis pallide fusco-flavescentibus; stigmate obscure fusco; venulis centralibus et vena pobrachiali fusco-nebulosis; pedibus fuscis, femorum basi pallide ferruginea; long. lin. 4–4½.

Head cinereous; palpi and antennæ brown; third joint of the latter faintly rufescent. Thorax cinereous; stripes obsolete, pleuræ hoary; halteres pale yellow; feet brown; coxæ cinereous, base of femora pale ferruginous. Abdomen blackish cinereous; horny parts of the genitals ferruginous and brown (♀ forceps fig. 37.) Wings yellowish, slightly infuscated; subcostal and mediastinal areæ with a yellow tinge, as well as the veins enclosing them; the other veins brown; stigma dark brown, oblong, central cross-veins, pobrachial vein and origin of petiole clouded; the portion of the radial vein preceding the fork, and that of the cubital vein preceding the central cross-vein, are of about the same length with the latter; two stigmatical cross-veins is not far from the tip of the subcostal vein, and about the middle of the upper branch of the radial fork.

Six specimens (four ♂ and two ♀.) Washington (nob.) in April; New York (Dr. Pitch); Mass. (Mr. Scudder.)

The cinereous color of the thorax seems to be due to a microscopic pubescence on a black ground.

9th Section.

(Subgenus Dactylolabis nob.)

Body moderately stout, feet long, slender; proboscis a little elongated, although much shorter than the head; palpi elongated. Antennæ not reaching much beyond the base of the wing; first joint long, cylindrical; second short; the following elliptical, clothed in the ♂ with a dense microscopic pubescence, besides the short, bristle-like verticils. ♂ forceps with elongated, soft, digitiform appendages, which do not overlap in repose. (Fig. 28, forceps of L. montana in repose; fig. 28*a* the same, from the side.) ♀ ovipositor with short, lamelliform, slightly curved valves.

L. montana. Thorace cinereo; vittis quatuor fuscis; alarum margine anteriore maculis quinque fuscis, media in fasciam, usque ad venam pobrachialem, extensa; long. lin. 3½–4.

Head cinereous; proboscis, palpi and antennæ brown; four basal joints of the latter cinereous. Præscutum cinereous with four brown stripes; the intermediate ones nearly reach the collare; the lateral ones extend over the scutum; pleuræ hoary; scutellum and metathorax hoary-brown; poisers pale; feet dark tawny; tips of femora and tibiæ darker; tarsi brown. Abdomen brownish; margins of segments paler; ♀ ovipositor ferruginous (see above, for details about the ♂ and ♀ genitals.) Wings with five brown spots on the anterior margin; the third one is prolonged in a band across the central cross-veins, as far as the pobrachial vein; the fifth nearest to the tip of the wing, is very small; the lower discal cross-veins and origin of the petiolated areolet are also spotted; veins brown, naked; subcostal pale.

Common in Washington in April and May, in dry, rocky localities. Mass. (Mr. Scudder.) Illinois (Mr. Kennicott.)

Compared 19 ♂ ♀ specimens.

In some specimens the spots on the wings are much larger than in others; the stripes on the thorax are also more or less distinct.

10th Section.

(Subgenus Dicranophragma nob.)

Wings broad, posterior margin rounded; a supplementary cross-vein unites both branches of the radial fork near their tip. Antennæ hardly reaching the base of the wings; basal joint long, cylindrical: the second stout, rounded; the following joints short, subglobular, becoming more elongated and slender towards the tip of the antennæ; verticils moderately long; the fourth and fifth basal joints of the flagellum are densely pubescent on the under side of the ♂.

L. fuscovaria. Antennis basi pallidis; thorace cinereo, fusco-variegato; pedibus pallidis; alis fusco-variegatis; long. lin. 2½–3.

Head cinereous, proboscis and palpi brown; antennæ pale at base, darker towards the tip, with moderate verticils. Thorax cinereous with three narrow brown stripes; the intermediate one, which is paler, ends in two black dots near the collare; pleuræ with two brown stripes; one begins at the collare; the other at the fore coxæ; both running backwards; brown spots near and on the coxæ; scutellum cinereous with two, sometimes indistinct, brown spots; metathorax cinereous, its latter half brown; halteres pale, with the tip slightly dusky; feet pale, clothed with hair; tip of the tarsi a little darker. Abdomen brown, paler at the incisures; lateral margins darker; ♂ forceps pale; ♂ ovipositor ferruginous, long, slender, nearly straight. Wings variegated with numerous little round, brown dots; five larger, nearly square spots along the anterior margin; the first a little beyond the humeral veinlet; the second at the origin of the petiole; the third on the central cross-veins, descending nearly to the discal areolet; the fourth at the tip of the subcostal

vein; the fifth at the tip of the upper branch of the radial vein. The first three longitudinal veins and the base of the others are pale.

Compared 13 specimens (♂ and ♀.)

Virginia, Trenton Falls, etc., (nob.) June, July.

This species is very easy to recognize by the cross-vein which divides the second radial area in two sections.

11th Section.

Wings without petiolated areolet, somewhat like Meig. i. tab. v. f. 4.

This group is purely artificial and comprises two species which have the above character in common.

L. quadrata. Cinerea, antennis palpisque fuscis, pedibus pallide ferrugineis, femorum, tibiarum tarsorumque apicibus fuscis, alis subhyalinis; long. lin. 2¾–3¼.

Front and vertex greenish cinereous; palpi and antennæ brown; basal joints of the flagellum a little paler; verticils long. Thorax cinereous; præscutum yellowish cinereous without distinct stripes; pleuræ slightly hoary; halteres pale; feet yellowish ferruginous; coxæ and base of femora pale yellow; tips of femora, tibiæ and tarsi brown. Abdomen brownish; genitals yellow. Wings slightly infuscated, pale at the root; stigma pale; veins brown; subcostal and mediastinal veins pale yellow; the mediastinal cross-vein is near the tip of the mediastinal vein; the stigmatical cross-vein is immediately beyond the origin of the radial fork; the central cross-veins form a nearly straight line.

Ten ♂ ♀ specimens. Virginia, Maryland, in May and June (nob.)

L. lenta. Pallide silacea, antennarum flagello palpisque infuscatis, fronte canescente, alis hyalinis, stigmate pallide infuscato; antennæ maris dense pubescentes; long. 2¾–3¼.

Pale ochraceous yellow; palpi and antennæ (excepting the basal joints) fuscous; antennæ of the ♂ thickly covered with a short pubescence; verticils in both sexes short; joints oval: last joint small, club-shaped; front hoary; vertex infuscated; tip of the tarsi infuscated. The falciform appendages of the ♂ forceps are more diverging in this species than in the others of the genus. Wings pale yellowish; costal, mediastinal, subcostal and pobrachial veins yellow; the others brown; stigma slightly infuscated round the cross-vein, which is situated near the origin of the radial fork (a little before or a little beyond it, its position differing sometimes on both wings of the same specimens); mediastinal cross-vein near the tip of the mediastinal vein.

The general appearance of this species is very much like that of L. areolata, but it is easy to distinguish the former by the absence of the petiolated areolet, the shorter discal areolet, etc.

Compared ten ♂ ♀ specimens. Virginia, Maryland, D. C., May, June (nob.) Illinois (Mr. Kennicott.)

12th Section.

Wings covered with a fine pubescence on the whole surface; no petiolated areolet; neuration like Meig. vol. i. tab. v. f. 4, but second radial area nearly as long as the lower one; *antennæ with apparently 17-joints;* palpi short.

The location of this group within the present genus is only temporary; the pubescence of the wings and the number of joints of the antennæ would seem to justify its separation; but having only a single specimen in my possession, I have not been able to come to any definite conclusion as to its position in the system.

L. pilosella. Pallide fusca; antennis, palpis et fronte fuscis; tergo et

halterum capitulo infuscatis; alis pallide fuscescentibus, pilosis. Long. lin. 3½.

Proboscis and palpi fuscous; front and vertex infuscated in the middle, cinereous near the eyes; antennæ fuscous, with long verticils, and apparently 17-jointed. Thorax tawny, a little darker on the præscutum, pleuræ paler; metathorax pale brown; halteres pale at base; knob infuscated; feet tawny, slightly hairy, infuscated at the tip of femora and tarsi. Tergum brown, venter paler; valves of ♀ ovipositor long, narrow, sharp, and but slightly curved. Wings infuscated, covered with a short, sparse, almost microscopic pubescence, which is evenly spread over the whole surface; *it is not woolly*, like in Eriopt e ra and does not affect much the transparency of the wing. The stigma is indistinct; the second radial area is nearly equal in length to the cubital; the three central cross-veins form almost a straight line; the mediastinal cross-vein is near the tip of the mediastinal vein.

A single ♀ specimen. Trenton Falls (nob.)

This species has a striking resemblance with Ula p i l o s a: the latter, however, is easily distinguished by the position of the mediastinal cross-vein, which is remote from the tip of the mediastinal vein; by the hairy eyes, the longer palpi, and the valves of the ♀ ovipositor, which are much shorter, broader and more curved.

Trichocera Meig.

This genus is mentioned here with the purpose only of showing its affinities.

It is allied to genus L i m n o p h i l a *nob.*, by the neuration of the wings (two radial area, petiolate areolet, etc.,) its spurred tibiæ with smooth ungues and distinct pulvilli; although the joint of the antennæ are indistinct, as in L i m n o p h i l a. (See his remark to plate xxvi. fig. 8, in Walker's Ins. Brit. Dipt. vol. iii.)

But T r i c h o c e r a differs from L i m n o p h i l a *nob.*, by the position of the mediastinal cross-vein, which is at a moderate distance from the tip of the mediastinal vein, *although not anterior to the origin of the petiole*, by the shortness and incurved direction of the axillary vein and by the length of the last joint of the palpi.

The American species in my collection appear to be identical with the European species of this genus; I would not venture to describe them, therefore, before having carefully compared them with specimens from the other continent.

Anisomera Meig.

The characters of the only North American species in my possession agree with those of this genus as defined by Meigen, Zetterstedt and Walker. The wings are exactly like Meig. i. tab. vii. f. 8. I perceive but six joints in the antennæ of the ♀ and not *ten* as Mr. Westwood does (see Walk. Dipt. Brit. iii. tab. xxvi. f. 9.)

Like A r r h e n i c a and E r i o c e r a, this genus is allied to L i m n o p h i l a *nob.*, by its two radial areæ, the spurs at the tip of the tibiæ, the distinct pulvilli and the form of the ♀ genitals.

A. m e g a c e r a. Obscure cinerea, thorace vittis tribus fuscis; antennis ♂ corpore longioribus, nigris; pedibus nigris, femoribus basi pallide fuscis; alis subcinereis; long. lin. 2½.

Head cinereous, brownish on the front; palpi and antennæ black; the latter, in the ♂, by the one-half longer than the body with a fine pubescence; their basal joints short, the tip of the third reach considerably beyond the base of the wing; the fourth, fifth, and sixth are about equal in length and a little shorter than the third; antennæ of the ♀ short, not reaching the base of the

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; the third joint is the longest; the sixth is very short, almost rudi-
l. Thorax cinereous, with a brownish, cuneiform, axillary intermediate
and two lateral stripes, which are abbreviated before and extended
e scutum behind; metathorax cinereous; halteres pale at the base;
blackish; feet black, base of femora tawny. Abdomen blackish; ♂
s black; ♀ ovipositor very short, brownish. Wings subcinereous,
black; subcostal area tawny; neuration like Meig. i. tab. vii. f. 8.
♂ specimens from Washington, D. C., and one ♀ from Maryland;
n the Spring.

ERIOCERA Macq.

s with a tubercle behind the antennæ. Antennæ rather short, nearly
same length in ♂ and ♀, six (or seven) jointed; third joint twice as
s the fourth. Proboscis short; palpi nearly as long as the head; second
ird joints of about the same length; the last joint about twice as long.
remote, naked. Feet long, moderately stout, tibiæ with distinct spurs;
rith distinct pulvilli. Wings with two cubital areæ and no petiolate
t (somewhat like Meig. i. tab. v. f. 4.) Forceps of the ♂ very much
ike that of Arrhenica (see fig. 31.) Ovipositor of the ♀ of moderate

Eriocera is closely allied to Arrhenica, but is distinguished by the
ae, which are short in both sexes, and by the structure of the palpi.
quart founded this genus in 1838, on a Brazilian species. (Diptères Ex-
s i. 1. p. 74.)

ulginosa. Nigro-fusca: basi antennarum et pedibus fulvo-ferrugi-
apice femorum, tibiarumque nigra; alis nigro-fuscis; length 4–5 lin.
er part of the head and proboscis tawny; palpi black; antennæ black;
joints yellowish ferruginous. Thorax dull brown with a slight grey te-
n; four brown more or less distinct stripes on this grey ground: halteres
; feet ferruginous, tip of femora and tibiæ brown, tarsi brown. Abdo-
rown, shining; male forceps tawny (see fig. 31); female ovipositor fer-
ous tawny at the base. Wings brown, clouded along the veins; stigma
r brown.
e male and one female specimens from Berkely Springs (Va.) and Wash-
, D. C.
sses two male specimens from Virginia, which are very different from
rmal ones. The whole body is cinereous; the stripes on the thorax are
distinct; the wings are pale brownish. It is not impossible that they
g to a different species.

ARRHENICA nob.

nt with an abrupt tubercle behind the antennæ. *Antennæ of ♂ 6-jointed, less than twice as long as the body, with a row of small, erect spines on the under three of the ♀ not longer than the thorax*, 10-jointed, the last joint being indistinct. Proboscis much shorter than the head. Palpi longer than roboscis, sometimes longer than the head; the second and fourth joint nearly longer than the third. Eyes remote, naked. Feet long, tibiæ with st spurs; tarsi with distinct, well developed pulvilli. Neuration of the like that of Limnophila; with two areæ and with or without ubital areolet. Forceps of the ♂ somew lar to that of Limno-a, consisting of an elongated, subcylindric piece with two foli-appendages (see fig. 30, and detail ed to it,) ovi-r of the ♀ elongated in a spine, iegrnis.
long antennæ of the ♂ Arrhen ea d th us ago-
Wied.; but these genera differ are
n the species described by Wied

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jointed; and further he does not make any mention of the spines on the under side of the joints, peculiar to the ♂ Arrhenica; 2d, *by the wings*, which, according to Wiedemann, are like those of Tipula, where, as in Arrhenica the neuration is like that of Limnophila, and the position of the last externo-medial vein shows unmistakeably that this neuration belongs to the type of the Tipulæ brevipalpes; 3d, *by the palpi*, which, according to Wiedemann have joints *of almost equal length* in Megistocera; this is not the case in Arrhenica.

Besides Wiedemann, Macquart and Westwood have described species of Megistocera from different parts of the world. But there is disagreement between these authors as to the characters of the genus, a disagreement which makes one suspect that the species described by them might belong to different genera, only having the extraordinary length of the antennæ in common. Thus, disagreeing with Wiedemann, Westwood (in the Ann. de la Soc. Ent. de France, 1835, p. 682,) describes a M. dimidiata from New Holland, whose ♀ has short antennæ. The same is the case with Macquart's M. limbipennis ♀ (Dipt. Exotiques, Suppl. i. p. 17); moreover, according to him, these antennæ are 13-*jointed*, and those of the ♂ are described as *finely pubescent on the inside*; the last joint of the palpi of the same species is said to be *long* and *flexible*, in contradiction to Wiedemann's description of the palpi of Megistocera.

But these three authors seem to agree in one point, *the neuration of the wings*, and in this point all the species described by them differ from the two species of Arrhenica described below. The wings of the former species are described and figured as being like those of Tipula; the wings of the latter are exactly like those of Limnophila.

Besides Wiedemann's above quoted words, Macquart's figures of M. fusca na and limbipennis (in Dipt. Exot. Suppl. i. tab. ii. iii. iv.) show *the last externo-medial vein originating from the pobrachial areolet*, a diftinctive character of the neuration of the Tipulæ longipalpes. Arrhenica does not even show an approach to such a neuration.

The name Arrhenica is given in allusion to the length of the antennæ of the ♂, and the *prevalence* in this respect of this sex over the other.

The two species described below may be easily distinguished thus:

A petiolate areolet	A. spinosa.
No petiolate areolet . . . :	A. longicornis *Wk.*

A. spinosa. *Alæ areola petiolata instructæ*, infuscatæ, stigmate oblongo, obscure fusco; thorax vittis quatuor distinctis, mediis approximatis; long. ♂ 4½–5; ♀ circa 9 lin.

♂ Head cinereous, tawny below and on the anterior side of the tubercle; labium and palpi black; antennæ more than twice as long as the body, black, two basal joints tawny; the first three joints reach a little beyond the base of the wing; the fourth is longer than the third, and each of the following joints is longer than the preceding one; the sixth is as long or longer than all the others together. Thorax cinereous, clothed with a soft cinereous down; prescutum with four blackish stripes; the intermediate pair approximated, parallel, limited behind by the suture; lateral stripes broader, abbreviated before and extended over the scutum behind; scutellum brownish cinereous; metathorax more or less dark brown; pleuræ with a hoary reflection on their lower part; halteres pale at the base, knob black; coxæ hoary, trochanters and base of femora yellowish tawny; femora and tibiæ tawny with brown tips; tarsi brown. Abdomen greyish black; lateral edges, especially beyond the third segment, yellowish; venter paler; forceps tawny; structure like fig. 80. Wings infuscated; subcostal area tawny; stigma oblong, brown, situated between the mediastinal and stigmatical cross-veins and divided in two by the subcostal vein; subapical area about equal in length to the second radial;

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cubital a little longer; petiolate areolet shorter than its petiole. ♀ differs from the ♂ by the brownish-ferruginous tinge of its body. The antennæ are not longer than the head and the thorax together; they have no spines but only sparse hairs; ten indistinct joints can be counted; ovipositor ferruginous.

I possess two specimens of the ♂: one caught by me near Trenton Falls, N. Y., the other by Mr. Scudder in Mass. My only female specimen I also brought from Trenton Falls, and do not doubt of its specific identity with the males.

A. longicornis. Cinerea, *alæ absque areola petiolata*; stigmate subquadrato, fusco; thorace vittis tribus obscuris; long. lin. 4–5.

? Anisomera longicornis Walker, List of Diptera of the Brit. Mus. i. p. 82.

Head cinereous, palpi black, antennæ black; two basal joints pale; those of the ♂ are three or four times longer than the body; the third joint reaches beyond the base of the wing; every following joint is longer than the preceding; the sixth joint as long as the fourth and fifth together; the spines on the lower surface of the antennæ become short and indistinct towards its end; besides the spines there is a microscopic pubescence on the same side of the antennæ; antennæ of the ♀ hardly reaching beyond the origin of the wing; no spines, but hairs; two basal joints and base of the third yellowish; third joint as long as the two first, taken together; the fourth more than twice shorter than the third; the fifth a little longer than the fourth; the following three joints are of about the same length; the ninth is a little longer and the tenth a little shorter than the preceding ones. Thorax cinereous; a long straight pubescence on the sides in the ♂; no such pubescence in the ♀; three blackish stripes on the præscutum; intermediate stripe cuneiform, with a distinct brown line in the middle; the lateral ones abbreviated before and extended over the scutum behind; the lower portion of the pleuræ hoary; scutellum and metathorax grey; halteres pale; feet black; coxæ cinereous, trochanters and femora tawny, except the tip of the latter, which is brown. Abdomen greyish black; genitals of the same color; ovipositor of the ♀ very short, (not longer than the segments of the abdomen). Wings whitish-cinereous, with brown veins; no petiolate areolet; subapical area longer than the second radial; cubital a little longer than both; stigma situated between the mediastinal and stigmatical cross-veins, and not much longer than broad.

Mr. Walker's description agrees quite well with my specimens, only he does not mention the spines on the antennæ, nor the presence of the discal areolet; the latter characters especially he ought to have mentioned, as the genus Anisomera, in which he locates this species, has no discal areolet in its typical form. The correctness of my identification is not therefore quite certain.

I have two ♂ specimens; from Maine, (Mr. Packard); from Trenton Falls (Cob.), and one ♀ from Illinois, (Mr. Kennicott.)

AMALOPIS Halid.

Front with a tubercle behind the antennæ. Palpi nearly as long, or longer, than the head; last joint much longer than the preceding. Eyes hairy. Mediastinal cross-vein far removed from the tip of the mediastinal vein, and anterior to the origin of the petiole. Discal areolet (when extant) pentagonal, the second lower discal cross-vein being very oblique. Wings divaricate in repose. The ♂ genitals are totally different in their structure, both from Limnobia and Limnophila, and seem to approach those of Tipula; the forceps consist of a coriaceous substance, with a halmat-shaped lobe and several horny branches on the inside, (fig. 32, forceps of *A. inconstans*.) On account of this hard substance, these organs preserve pretty well in dry specimens.

Such are the characters which separate from Limnophila nob. and in general from the whole tribe of the Tipularie *with short palpi*, a distinct natural group, consisting of the three species described below, under the temporary generic denomination of Amalopis *Halid.* and of Pedicia *Latr.* This group has the following characters in common with Limnophila *nob.*

Two radial area; tibiæ armed with spurs at the tip; pulvilli distinct; antennæ 16-jointed, (17-jointed in A. inconstans *nob.*)

The neuration of the wings is pretty much like that of Pedicia, (see Meig. I. tab. iv. f. 14); but is very inconstant. It varies not only in the different species of the group, but in different specimens of the same species, nay on both wings of the same specimen.

In A. calcar, as well as in Pedicia, it is the *cubital* vein which forks, instead of the *radial*. In A. inconstans it is sometimes the radial, sometimes the cubital vein which forks; the passage from one to the other form is very gradual, and shows the secondary value of this character in the present genus.

The discal areolet is wanting in A. occulta; it is generally present, but sometimes wanting in A. inconstans; it is extant in the only specimen of A. auripennis which I possess; finally in *both* of my specimens of A. calcar it is *wanting* on one wing and *extant* on the other.

A constant and for this reason important character is the location of the mediastinal cross-vein *anterior* to the origin of the petiole.

Mr. Haliday was the first, I believe, who noticed (in Walker's Dipt. Brit. iii. p. xv., Addenda,) that L. occulta *Meig.* had *hairy eyes and a frontal tubercle.* On these two characters, and *on the absence of the discal areolet* he established (l. c.) the genus Amalopis. Although I do not know A. occulta *Meig.*, I have no doubt, from its description and the figures of its wing in the authors, that it belongs *to the same group* with the three species described below, although the location of these species *in the same* genus may be only temporary. (I am certain, for instance, that A. inconstans with its 17-jointed antennæ will be formed into a new genus.) I prefer to retain in the mean time for all the species of this group the name given by Mr. Haliday to one of them.

Pedicia undoubtedly belongs to the same group. It possesses all the above mentioned generic characters, excepting, *perhaps*, the pubescent eyes. Although Mr. Walker (Dipt. Brit. iii. p. 314,) asserts that the eyes are minutely pubescent, I could not discover any traces of this pubescence in my specimens; it may have been rubbed off.

The natural group, consisting of the genera Amalopis and Pedicia, seems to hold an intermediate position between the Tipularia with *short* and those with *long* palpi, (that is between Limnobia *Meig.* and Tipula *Meig.*) Although closely allied to the former, they approach Tipula by their *divaricated wings*, their *elongated palpi*, *the form of the discal areolet* and the structure of the ♂ forceps. The genus Tricyphona *Zett.*, unknown to me, belongs, perhaps, to the same group. However, Zetterstedt describes the tibiæ as *unarmed*, and this would be an important difference. The genus Evanioptera, established by Guérin, on a species from Brazil, (Voyage de la Coquille, 1830.) seems also to belong hither. Limnobia littoralis *Meig.*, judging from the neuration of its wing, might be closely allied to my A. inconstans. Limnobia unicolor *Schum.*, ought, perhaps, to be located here too.

The habits of Amalopis are unknown, but they seem to be aquatic. The larva of Pedicia rivosa has been found by Scheffer (see Rossi, Dipt. Austriaca,) in spring-water.

A. auripennis. Thorace cinereo, vittis tribus fuscis; alis infumate topazinis, nitidis, venulis centralibus infuscatis; long. lin. 5.

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Head cinereous, with a golden pubescence; palpi brown, pale at base; antennæ brown, three or four basal joints pale; first joint cylindrical; second cyathiform; third smaller, obconical; joints from fourth to tenth short, cylindrical, compressed, gradually attenuated, covered with short hairs; the last part of the antennæ is filiform, with long verticils; eyes distinctly pubescent. Collare pale, with a brown spot: thorax cinereous, with three brown stripes; intermediate one broad, splitting in two lobes before the scutum, which is brownish; scutellum and metathorax cinereous; pleuræ cinereous; halteres pale; coxæ pale; feet pale tawny, tips of the femora fuscous; those of the tibiæ and tarsi infuscated; spurs at the tip of the tibiæ moderately long, very distinct. Tergum brown, with a sparse golden pubescence; venter pale. Wings laminate topazine, their surface shining; subcostal area faintly yellowish; central cross-veins, stigmatical cross-vein, tip of mediastinal vein and origin of petiole clouded; the radial vein forks (as usual), but the petiole of its fork is so short, that the second radial is almost equal in length to the cubital; stigmatical cross-vein at the tip of subcostal vein; the first lower discal cross-vein is situated at about the middle of the distance, between the origin of the two forks, which it unites; stigma pale.

One ♂ specimen from Massachusetts, (Mr. Scudder.)

A. **A. calcar.** Ochracea, fronte cinerea; alis pallide cinerascentibus; area subcostali flavescente, stigmate pallido; calcaribus tibiarum longioribus; long. lin. 4½—5.

Front and vertex cinereous, proboscis yellowish cinereous, palpi yellow at base, two last joints brown; antennæ yellowish ferruginous, infuscated at tip, reaching about half the distance between the head and the base of the wing; second joint obconical; the following joints subcylindrical, moderately verticillated and covered with a dense pubescence; eyes pubescent. Thorax ochraceous yellow, reddish on præscutum; stripes indistinct; pleuræ, scutum, scutellum and metathorax paler, halteres pale; feet yellowish tawny, infuscated outwards the tip; coxæ and base of femora pale; spurs at the tip of the tibiæ longer than usual, slender, divaricated. Abdomen yellowish, (infuscated at the tip in the ♂.) Wings hyaline, slightly cinereous; subcostal area yellowish, stigma pale; second radial area longer than the cubital (the *cubital* and not the *radial* vein forming the fork), and of nearly the same length with the subapical area; radial vein arcuated before joining the petiole; stigmatical cross-vein near the tip of the subcostal vein.

In both specimens in my possession the discal areolet is wanting on one wing and extant on the other; what the normal neuration is, I am unable therefore to state. On those wings where it is wanting, (which happens to be the *left* wing in the ♂ specimen and the *right* in the ♀,) the neuration looks pretty much like Meig. i. tab. v. f. 8. The cross-vein closing the areolet on the other wing is in the middle of the distance, between the origins of the second and third fork.

A. **A. inconstans.** Ochracea, thoracis dorso ferrugineo, alarum margine anteriore et venis transversis infuscatis; long lin. 4½—5½.

Coloring very inconstant; ochraceous, more or less mixed with brown on the thorax and the abdomen, sometimes altogether without brown. The following is the description of the specimens with fully developed dark coloring: Proboscis and palpi fuscous; front cinereous, brownish towards the vertex; hind part of vertex and under side of the head yellowish; antennæ 17-jointed, pale, but little longer than the head; basal joint sometimes dusky; flagellum with moderate verticils. Collare ochraceous; a black ring near the head; a brown stripe along the middle; præscutum ferruginous, with a slight brown tinge along the middle; stripes indistinct; scutum infuscated on both sides; a brown mark in the shape of a V in the middle of the suture; scutellum and metathorax yellow, fuscous on both sides; pleuræ pale; halteres pale; feet

yellow, femora and tibiæ faintly infuscated at the tip; tarsi tawny, fuscous at tip, spurs short. Tergum yellow; posterior margins of segments fuscous; first and second segments infuscated, the following with a fuscous stripe along the middle; the two last segments fuscous; genitals of the ♂ fuscous; of the ♀ ferruginous. Wings subcinereous; subcostal and mediastinal areæ brown; this color occupies the whole base of the wing and encroaches also on the præbrachial and both radial areæ; mediastinal, stigmatical and central cross-veins and origin of petiole clouded with brown.

This is the normal coloring; but among the eighteen specimens which I have before me only *four* show it in its full development. All the others are more or less pale about the collare, scutum, scutellum, metathorax and abdomen, sometimes with a slight indication of brown, sometimes without any.

The coloring of the wings is also variable, the fuscous tinge of the anterior margin and the clouds on the cross-veins being sometimes very pale. *The cinereous tinge of the front, the brown ring on the collare, near the head, the ferruginous, almost orange, color of the præscutum and the infuscated anterior margin of the wing may be considered as characteristic.*

The neuration of the wings is likewise inconstant. The normal neuration is exactly like Meig. i. tab. vi. f. 4, only the first lower discal cross-vein is a little nearer to the apex of the wing, (originating from the lower branch of the fork.) Among my eighteen specimens, *ten* (eight ♂ and two ♀) partake of this neuration.

In *three* specimens, the first lower discal cross-vein is removed nearer towards the base of the wing, *so that the first externomedial areolet is petiolate.* In one of the specimens this is the case with one wing only, the same areolet on the other being sessile.

In *three other* specimens the discal areolet is wanting, (that is, open from want of a second lower discal cross-vein.)

In *two* specimens it is the *cubital vein* which forms the fork, and not the radial, the latter originating *before* the fork. But in both instances the position of this vein on one wing does not agree exactly with that on the other. In one case the radial vein issues from the same joint with the fork.

The great cross-vein varies in its position also. Sometimes it is opposite, sometimes below the upper discal cross-vein.

In one specimen there are three supplementary cross-veins in the cubital area.

One character which seems to be merely accidental in other species, is very constant in this: it is *the presence of a stump of a vein near the origin of the petiole.* This stump is long and distinct, and is wanting only *on one wing* of one of my eighteen specimens.

Fifteen ♂ and three ♀ specimens. Washington, common early in April and later; New York and Virginia Springs (nob.); Connecticut, (Mr. Norton.)

This species seems to be allied to the European Limnobia littoralis *Meig.*

Pedicia Latr.

The characters of this genus have been mentioned in part in detailing those of Amalopis. For more details see Walker, Ins. Brit. Dipt. iii. p. 314. I would add only to Mr. Walker's characteristics of this genus, that *all* the tibiæ have two spurs at the tip and not *the hind tibiæ* alone.

P. albivitta. Walker, List of Dipt., etc., i. p. 37.

Head black, front hoary; antennæ pale brown. Thorax pale brown, with a strong silvery reflection; a brown stripe runs from the collare to the origin of the wing; præscutum with three brown stripes; the intermediate one is darker and capillary; halteres pale. Abdomen silvery, with a row of triangular brown

spots along the tergum; they are dark brown in the middle and ferruginous on the margins. Wings with a brown stripe along the costa; another one along the subbrachial vein; a brown band unites both across the central cross-veins; the rest of the wing is hyaline.

Length from 13 to 15 lines.

I possess specimens from Trenton Falls, (nob.), Massachusetts (Mr. Scudder), and Connecticut, (Mr. Norton.)

Dicranota Zett.

Antennæ 13-jointed.(*) Eyes hairy. Wings with two areæ. Tibiæ with small, but distinct spurs at the tip. Pulvilli distinct. Mediastinal cross-vein far remote from the tip of mediastinal vein, anterior to the origin of the petiole, and situated about the middle of the anterior margin. Structure of the ♂ genitals analogous to that of Amalopis and Pedicia. Head small; probescis and palpi very short; a distinct gibbosity on the head behind the antennæ; feet of moderate size and thickness.

The wing of my D. rivularis is exactly like Mr. Westwood's figure of that of D. pavida in Walker's Ins. Brit. Dipt. iii. tab. xxx. f. 7, having no discal areolet, two cross-veins between the upper branch of the radial vein and the subcostal, and one fork behind the subapical areolet. The neuration varies in different species of the genus, *but the position of the mediastinal cross-vein seems to be an essential character.*

This genus was first established by Prof. Zetterstedt on his D. Guerinii; afterwards, Mr. Haliday, in Walker's Ins. Brit. Dipt. iii. p. 306, added to it D. pavida *Hal.*, D. bimaculata *Schum.*, and D. senilis *Hal.* However, D. bimaculata *Schum.* is mentioned in Prof. Zetterstedt's work (Dipt. Scand. tom. x. p. 3897, No. 72,) among the Limnobiæ. How should have Zetterstedt misplaced a species belonging to a genus established by himself, unless he overlooked its having 13, and not 16, joints of the antennæ?

D. senilis *Hal.*, as figured in Ins. Brit. Dipt. iii. tab. xxvii. f. 3, is quite distinct from the other species by the presence of a discal areolet, by its having one cross-vein, instead of two, between the subcosta and the upper branch of the radial fork; and above all, by the position of the mediastinal cross-vein, which is posterior to the origin of the petiole, and not far distant from the tip of the mediastinal vein. If the latter character is correctly figured on the plate, I would doubt whether this species belongs to Dicranota.

The affinities of this genus with Amalopis and Pedicia (hairy eyes, position of the mediastinal cross-vein structure of the ♂ genitals, etc.,) are manifest; it is distinguished by the short palpi, the number of the joints of the antennæ, etc.

The only species described below, agrees in its characters with D. Guerinii *Zett.* on which, as mentioned above, the genus was first established. Only Prof. Zetterstedt does not make any mention of the hairy eyes, which he may have overlooked. (See also the remark about the antennæ, at the end of the description.)

D. rivularis. Cinerea, thorace vittis tribus fuscis, femorum basi pallida, alis subcinereis; long. lin. 3–4.

Head cinereous, front and vertex slightly infuscated; proboscis, palpi and antennæ black; the latter in both ♂ and ♀ short, not reaching the base of the wings, joints of the flagellum subglobular, (see the observation at the end of the description). Thorax cinereous with three distinct, blackish stripes, the intermediate one broad, and, in some specimens, distinctly capillary; lateral one abbreviated before, extended over the scutum behind; scutellum and metathorax cinereous, posterior half of the latter blackish; halteres

(*) As to the length of the antennæ, see *observation* at the end.

halterum capitulo infuscatis; alis pallide fuscescentibus, pilosis. Long lin. 3¼.

Proboscis and palpi fuscous; front and vertex infuscated in the middle, cinereous near the eyes; antennæ fuscous, with long verticils, and apparently 17-jointed. Thorax tawny, a little darker on the præscutum, pleuræ paler; metathorax pale brown; halteres pale at base; knob infuscated; feet tawny, slightly hairy, infuscated at the tip of femora and tarsi. Tergum brown, venter paler; valves of ♀ ovipositor long, narrow, sharp, and but slightly curved. Wings infuscated, covered with a short, sparse, almost microscopic pubescence, which is evenly spread over the whole surface; *it is not woolly*, like in Eriop-tera and does not affect much the transparency of the wing. The stigma is indistinct; the second radial area is nearly equal in length to the cubital; the three central cross-veins form almost a straight line; the mediastinal cross-vein is near the tip of the mediastinal vein.

A single ♀ specimen. Trenton Falls (nob.)

This species has a striking resemblance with Ula pilosa: the latter, however, is easily distinguished by the position of the mediastinal cross-vein, which is remote from the tip of the mediastinal vein; by the hairy eyes, the longer palpi, and the valves of the ♀ ovipositor, which are much shorter, broader and more curved.

Trichocera Meig.

This genus is mentioned here with the purpose only of shewing its affinities.

It is allied to genus Limnophila *nob.*, by the neuration of the wings (two radial area, petiolate areolet, etc.,) its spurred tibiæ with smooth ungues and distinct pulvilli; although the joint of the antennæ are indistinct, as in Limnophila. (See his remark to plate xxvi. fig. 8, in Walker's Ins. Brit. Dipt. vol. iii.)

But Trichocera differs from Limnophila *nob.*, by the position of the mediastinal cross-vein, which is at a moderate distance from the tip of the mediastinal vein, *although not anterior to the origin of the petiole*, by the shortness and incurved direction of the axillary vein and by the length of the last joint of the palpi.

The American species in my collection appear to be identical with the European species of this genus; I would not venture to describe them, therefore, before having carefully compared them with specimens from the other continent.

Anisomera Meig.

The characters of the only North American species in my possession agree with those of this genus as defined by Meigen, Zetterstedt and Walker. The wings are exactly like Meig. i. tab. vii. f. 8. I perceive but six joints in the antennæ of the ♀ and not *ten* as Mr. Westwood does (see Walk. Dipt. Brit. iii. tab. xxvi. f. 9.)

Like Arrhenica and Eriocera, this genus is allied to Limnophila *nob.*, by its two radial areæ, the spurs at the tip of the tibiæ, the distinct pulvilli and the form of the ♂ genitals.

A. megacera. Obscure cinerea, thorace vittis tribus fuscis; antennis ♂ corpore longioribus, nigris; pedibus nigris, femoribus basi pallide fuscis; alis subcinereis; long. lin. 2½.

Head cinereous, brownish on the front; palpi and antennæ black; the latter, in the ♂, by the one-half longer than the body with a fine pubescence; their basal joints short, the tip of the third reach considerably beyond the base of the wing; the fourth, fifth, and sixth are about equal in length and a little shorter than the third; antennæ of the ♀ short, not reaching the base of the

[illegible]

the third joint is the longest; the sixth is very short, almost rudi-
. Thorax cinereous, with a brownish, cuneiform, axillary intermediate
and two lateral stripes, which are abbreviated before and extended
o scutum behind; metathorax cinereous; halteres pale at the base;
blackish; feet black, base of femora tawny. Abdomen blackish; ♂
s black; ♀ ovipositor very short, brownish. Wings subcinereous,
lack; subcostal area tawny; neuration like Meig. i. tab. vii. f. 8.
♂ specimens from Washington, D. C., and one ♀ from Maryland;
n the Spring.

ERIOCERA Macq.

s with a tubercle behind the antennæ. Antennæ rather short, nearly
same length in ♂ and ♀, six (or seven) jointed; third joint twice as
s the fourth. Proboscis short; palpi nearly as long as the head; second
ird joints of about the same length; the last joint about twice as long.
ocelli, naked. Feet long, moderately stout, tibiæ with distinct spurs;
ith distinct pulvilli. Wings with two cubital areæ and no petiolate
l (somewhat like Meig. i. tab. v. f. 4.) Forceps of the ♂ very much
ke of Arrhenica (see fig. 31.) Ovipositor of the ♀ of moderate

Eriocera is closely allied to Arrhenica, but is distinguished by the
ae, which are short in both sexes, and by the structure of the palpi.
quart founded this genus in 1838, on a Brazilian species. (Diptères Ex-
s i. 1. p. 74.)

uliginosa. Nigro-fusca: basi antennarum et pedibus fulvo-ferrugi-
apice femorum, tibiarumque nigra; alis nigro-fuscis; length 4–5 lin.
er part of the head and proboscis tawny; palpi black; antennæ black;
joints yellowish ferruginous. Thorax dull brown with a slight grey re-
n; four brown more or less distinct stripes on this grey ground: halteres
; feet ferruginous, tip of femora and tibiæ brown, tarsi brown. Abdo-
rown, shining; male forceps tawny (see fig. 31); female ovipositor fer-
ous tawny at the base. Wings brown, clouded along the veins; stigma
r brown.
e male and one female specimens from Berkely Springs (Va.) and Wash-
, D. C.
sses two male specimens from Virginia, which are very different from
rmal ones. The whole body is cinereous; the stripes on the thorax are
distinct; the wings are pale brownish. It is not impossible that they
g to a different species.

ARRHENICA nob.

ad with an abrupt tubercle behind the antennæ. *Antennæ of ♂ 6-jointed, thin, twice as long as the body, with a row of small, erect spines on the under thread of the ♀ not longer than the thorax,* 10-jointed, the last joint being indistinct. Proboscis much shorter than the head. Palpi longer than proboscis, sometimes longer than the head; the second and fourth joint half longer than the third. Eyes remote, naked. Feet long, tibiæ with ut spurs; tarsi with distinct, well developed pulvilli. Neuration of the e like that of Limnophila, with two radial areæ and with or without lateral areolet. Forceps of the ♂ somewhat similar to that of Limno-la, consisting of an elongated, subcylindrical basal piece with two foli-appendages (see fig. 30, and detailed description appended to it.) Ovi-r of the ♀ elongated in *A. spinosa*, short in *A. longicornis*.
e long antennæ of the ♂ Arrhenica remind us of the genus Megalo-a Wied., but these genera differ: 1st, by the antennæ of the ♀ which are in the species described by Wiedemann; according to him they are 10-

The name Protoplasa alludes to the close relation of this genus to a fossil form.

P. Fitchii. Cinerascens, pedibus pallidis, alis maculis ocellaribus brunneis, in fascias confluentibus, ornatis; long. lin. 3–3½.

Head cinereous, proboscis and palpi fuscous, antennæ infuscated. Thorax cinereous, with three faint brown lines on the prescutum; scutellum pale, infuscated in the middle; halteres pale, knobs brown; feet yellowish; knees, tips of tibiæ, of the first joint of tarsi and of their last joints brown. Abdomen brown; posterior margins of segments paler. Wings whitish, with brown spots and bands; most of the spots have the form of a ring, with an infuscated vein in the centre; they are distributed in three groups: 1st, basal group, formed of an ocellus near the origin of petiole, a spot in the subcostal area and two rings at the basis of the wing, near the basal angle; 2d, central band, formed of four ocelli and a large brown spot near the posterior margin; 3d, apical band, formed of two large ocelli (at the tip of the discal areolet and at the origin of the radial fork); 6 or 7 smaller ocelli along the apical margin of the wing and a brown band, beginning between the two large ocelli, and running along one of the longitudinal veins towards the tip of the wing.

I am in doubt as to the sex of the two specimens of this insect, for which I am indebted to Dr. Asa Fitch.

Bittacomorpha Westw.

I take occasion to give the figure of the male genital organs of B. clavipes *Fab.* (fig. 33, from above; fig. 33*a* from below.) One pair of appendages (the outer ones), are coriaceous; the shorter, inner pair seems to be of a harder consistence.

This species seems to have a wide distribution over the North American continent. The British Museum has received it from Nova Scotia, (see Walker's List of Dipt. Brit. Mus. i. p. 81). I found it in Florida, and possess, besides, specimens from Upper Wisconsin River. It occurs early in the spring, and also in autumn, in woods, in the neighborhood of running water.

Ptychoptera Fabr.

For the characters of this genus I refer to Meigen, Zetterstedt and Walker, and will only mention, as a character which is peculiar to Ptychoptera, Bittacomorpha and Protoplasa, and which seems to have been overlooked, *that the transverse thoracic suture is deeply sinuated*, so that the scutum is attenuated in the middle, its two lobes being connected by a narrow band only.

The only American species I possess is very like the European species of this genus in general appearance, without seeming to be identical with any.

P. rufocincta. Nigra, abdomine (♀) maculis lateralibus apiceque ferrugineis, pedibus ferrugineis, alis macula basali et fasciis tribus fuscis; long. lin. 3½.

Head black, shining; proboscis and two basal joints of the black antennæ ferruginous; palpi pale. Thorax black, subopaque; pleuræ, with ferruginous spots and bands, and with a silvery reflection along the coxæ, and especially under the base of the wing; halteres pale; tip of the knob dusky; feet pale ferruginous; tips of the femora, of the tibiæ and tarsi, brown. Tergum black, shining; large ferruginous spots on the lateral margin of the 2d and the following segments; they occupy a large portion of the anterior part of the intermediate segments; tip of the abdomen and genitals (♀) ferruginous; venter tawny. Wings with a brown spot at the base; an abbreviated band about the middle of the præbrachial and pobrachial areæ, between the subcostal and pobrachial veins; a second band along the central cross-veins, attenuated behind, and not reaching the posterior margin; a third is formed of two spots at the origin of both forks; a brown dot at the tip of the

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subcostal vein; subcostal area yellowish; petiole very short, included within the second band, (differing in this respect from the European G. contaminata, figured in Walker's Ins. Brit. Dipt, iii. tab. xxviii. f. 7.)

One ♀ from Pennsylvania, (the anterior feet and the posterior tarsi of this specimen are wanting.)

Synoptical Table of the Genera and Species.

First group (*Tipulæ limnobiaformes.*)

LIMNOBIA nob.

Subgen. Geranomyia *Halid.*
rostrata *Say*, 207.
communis *n. sp.*, 207.
diversa *n. sp.*, 207.

Subgen. Rhipidia *Meig.*
maculata *Meig.*, 208.
domestica *n. sp.*, 208.
fidelis *n. sp.*, 209.

Subgen. Dicranomyia *Steph.*
liberta *n. sp.*, 209.
humidicola *n. sp.*, 210.
stulta *n. sp.*, 210.
distans *n. sp.*, 211.
pubipennis *n. sp.*, 211.
immodesta *n. sp.*, 211.
diversa *n. sp.*, 212.
gladiator *n. sp.*, 212.
gudica *n. sp.*, 212.
morio *Fabr.*, 212.
* * * *
defuncta *n. sp.*, 213.

Subg. Limnobia (sensu strictiori.)
solitaria *n. sp.*, 215.
cinctipes *Say*, 214.
immatura *n. sp.*, 214.
triocellata *n. sp.*, 216.
indigena, *n. sp.*, 215.
tristigma *n. sp.*, 216.
* * * *
argus *Say*, 217.

Second group (*Tipulæ anomalæ.*)

DICRANOPTYCHA nob.
germana *n. sp.*, 217.
sobrina *n. sp.*, 218.
nigripes *n. sp.*, 218.
sororcula *n. sp.*, 218.

ANTOCHA nob.
saxicola *n. sp.*, 219.
opalisans *n. sp.*, 220.

ELEPHANTOMYIA nob.
canadensis *Westw.*, 221.

RHAMPHIDIA Meig.
brevirostris *n. sp.*, 222.

TEUCHOLABIS nob.
complexa *n. sp.*, 223.

Third group. (*Tipulæ eriopteraformes.*)

GNOPHOMYIA nob.
tristissima *n. sp.*, 224.
luctuosa *n. sp.*, 224.

CRYPTOLABIS nob.
paradoxa *n. sp.*, 225.

ERIOPTERA nob.
chlorophylla *n. sp.*, 226.
vespertina *n. sp.*, 226.
septemtrionis *n. sp.* 226.
villosa *n. sp.*, 226.
chrysocoma *n. sp.*, 226.
venusta *n. sp.*, 227.
armata *n. sp.*, 227.
graphica *n. sp.*, 228.
holotricha *n. sp.*, 226.
Meigenii *n. sp.*, 226.
nubila *n. sp.*, 227.
caliptera *Say*, 227.
parva *n. sp.*, 227.
hirtipennis *n. sp.*, 228.
pubipennis *n. sp.*, 228.
ursina *n. sp.*, 228.

SYMPLECTA Meig.
punctipennis *Meig.*, 228.

CLADURA nob.
flavoferruginea *n. sp.*, 229.

GONOMYIA Meig.
sulphurella *n. sp.*, 230.
cognatella *n. sp.*, 230.
subcinerea *n. sp.*, 231.
blanda *n. sp.*, 231.

Fourth group. (*Tipulæ limnophilaformes.*)

LIMNOPHILA nob.

1st Section.

Subgen. Lasiomastix *nob.*
macrocera *Say*, 234.

2d Section.
Subgen. Idioptera *Macq.*
fasciata *Lin. Schum.*, 234.
3d Section.
aprilina *n. sp.*, 235.
4th Section.
tenuipes *Say*, 235.
5th Section.
(Limnophilæ typicæ.)
adusta *n. sp.*, 235.
luteipennis *n. sp.*, 236.
toxoneura *n. sp.*, 236.
imbecilla *n. sp.*, 237.
brevifurca *n. sp.*, 237.
areolata *n. sp.*, 237.
6th Section.
ultima *n. sp.*, 238.
7th Section.
Subgen. Epiphragma *nob.*
solstrix *n. sp.*, 238.
pavonina *n. sp.*, 239.
8th Section.
rufibasis *n. sp.*, 239.
9th Section.
Subgen. Dactylolabis *nob.*
montana *n. sp.*, 240.
10th Section.
Subgen. Dicranophragma *nob.*
fuscovaria *n. sp.*, 240.
11th Section.
quadrata *n. sp.*, 241.
lenta *n. sp.*, 241.
12th Section.
pilosella *n. sp.*, 241.

Trichosoma Meig., 242.
Fifth group. (*Tipulæ anisomeræformes.*)
Anisomera Meig.
megacera *n. sp.*, 242.
Eriocera Macq.
fuliginosa *n. sp.*, 243.
Arhiniica *nob.*
spinosa *n. sp.*, 244.
longicornis *Walk.*, 245.
Sixth group. (*Tipulæ pedicieformes.*)
Amalopis Halid.
auripennis *n. sp.*, 246.
calcar *n. sp.*, 249.
inconstans *n. sp.*, 247.
Phoxia Latr.
albivitta *Walk.*, 248.
Dicranota Zett.
rivularis *n. sp.*, 249.
* * * *
Ula Halid.
pilosa *Schum.*, 251.
APPENDIX.
Protoplasa *nob.*
Fitchii *n. sp.*, 252.
Bittacomorpha Westw.
clavipes *Fab.*, 252.
Ptychoptera Meig.
rufocincta *n. sp.*, 252.

On the male genital organs of the Tipulidæ *with short palpi, together with an explanation of Plates III. and IV.*

The form of the external male genital organs of the Tipulidæ *with short palpi* is that of *a forceps*; they are not different in this respect from the majority of the insects of the other orders. This forceps serves to seize the tip of the abdomen of the female. In the cases of copulation which I have observed in the genera Limnobia and Erioptera, the abdomen of the ♀ was seized *from below, a little before the hypopygium*, so that this organ was stretched on the tergum of the ♂. But, besides the external forceps, there is, between its two halves, a *second internal forceps-like apparatus*. After having secured the female in the described manner, the male, with this second apparatus, seizes the orifice of the inner genital organs of the female and adjusts thereon for copulation. This second forceps seems to vary in structure in different species.

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I have been able to see it distinctly in Arrhenica spinosa; it is figured and described below.

My chief attention has been directed to the structure of the external forceps for the purpose of classification; everything remains to be done, as yet, in the study of the more complicated and delicate internal organs. In the description of the figures which follows, I simply relate what I have seen, without attempting any generalization.

Fig. 1, forceps of L. defuncta from below.

Fig. 2, the same, from above; *aa*, soft, fleshy lobes; *bb*, horny, falciform appendages, moveable with the lobes, and closely *applied* although not *attached* to them; they are fastened only by the base; *cc*, horny, projecting points of the internal organs.

Fig. 3, forceps of Dicranomyia humidicola from above; *aa* and *bb* as in fig. 2; *dd*, horny, square appendages, bearing each a pair of bristles; *e*, point of the *anal style*, visible between the two lobes.

Fig. 4, forceps of Dicranomyia liberta from above; *aa* and *bb*, like in fig. 2; *dd*, horny, rostriform appendages, with bristles; *e*, anal style.

Fig. 4*a*, anal style of D. liberta, seen from below.

Fig. 5, one-half of the forceps of Dicranomyia gladiator from above; *a* and *b*, as in fig. 2; *e*, anal style.

Fig. 6, forceps of Limnobia solitaria from above, half closed; *aa*, moveable, coriaceous halves, with appendages (*bb*); these appendages consist of two lamels, which are closely applied to each other and never divergent; the outside lamel is horny; the inside one seems to be coriaceous; *e*, is the anal style; *cc*, projecting internal organs; *ff*, are soft eminences, (perhaps rudiments of the large *soft* lobes of Dicranomyia?)

Fig. 7, represents the forceps of Limnobia indigena from above; the lamels *bb* are also double; in some species, as in L. tristigma, I could not distinguish whether the lamels were double.

Fig. 8, forceps of Rhipidia domestica from above, and open; *aa*, *bb*, *cc*, *dd* and *e*, as in the preceding figures.

Fig. 9, the same forceps, from below and closed; *e*, anal style.

Fig. 10, forceps of Teucholabis complexa from above; 10 *a*, one-half of the same, from below; *aa* and *bb*, horny appendages.

Fig. 11, forceps of Antocha saxicola from above; *aa*, double appendages, consisting of a horny and a soft point, closely joined.

Fig. 12, half of the forceps of Elephantomyia canadensis from below; *aa*, horny appendages.

Fig. 12*a*, forceps of Dicranoptycha nigripes from above; *g*, are short, black bristles; *xx*, indistinct, horny appendages. In this species I had for the first time a glimpse of the structure of the slender, horny, hook-shaped organ, figured farther below (fig. 27*b*), but occurring in most species. When D. nigripes opens the forceps this hook comes into a sort of erection and spreads outside of the forceps in the shape of fig. 12, *b*; *aa*, are slender and horny; *bb*, is a small forceps, moving independantly of *aa*, and opening or closing at the point *c*.

Fig. 13, one-half of the forceps of D. sobrina.

Fig. 14, forceps of Cryptolabis paradoxa from above; 14 *a*, the same from below; *aa*, are horny appendages; they are small and indistinct, being closely applied to the fleshy part of the forceps; *b*, seems to be the rudiment of an anal style.

Fig. 15, tip of the abdomen of Cryptolabis paradoxa, female, from the side; fig. 15*a*, the same, from above; there are no visible horny lamels; the tips, *aa*, are beset with microscopic bristles.

Fig. 16, forceps of Gonomyia blanda from above and open.

Fig. 17, half of the forceps of Gonomyia cognatella, from above.

Fig. 18, forceps of Gnophomyia tristissima, from above, and half open; 18*a*, female ovipositor of the same species.

Fig. 19, half of the forceps of Erioptera vespertina, side view.

Fig. 20, forceps of Erioptera armata from above.

Fig. 21, the same, from the side. Its structure is somewhat complicated; besides the coriaceous parts *dd*, there are two pairs of horny appendages attached to them; they are invisible from above, except the tip of one of them, which projects at *f*. One of these appendages is seen at *h* in fig. 21; detached, it looks somewhat like fig. 21*a*, in which the portion *bbb* is closely applied to the inside of the lobe *d*, and the portion *c* branches off. The other pair of appendages (*ee* on fig. 21) is slender and curved; each of them is attached to one of the lobes *dd*.

Fig. 22, forceps of Erioptera caloptera *Say*, from below.

Fig. 23, forceps of Erioptera venusta from above.

Fig. 23*a*, the same from below; the horny appendages *aa*, seen from below, appear double, consisting of the horny part *bb*, and a membranaceous appendage *cc*; fig. 23*b* represents it detached; its margin *d* is horny, the rest is a thin membrane; these two appendages are not closely applied to each other, and have an interval between them, although they move simultaneously.

Fig. 24, forceps of Limnophila luteipennis, from above *aa*, two pairs of moveable falciform appendages; the outside ones are horny, the inside one seems to be of a softer consistence and are ciliated.

Fig. 25, forceps of Limnophila aprilina from above; structure almost like the preceding; the outside appendages have a longitudinal notch, (fig. 25*b*.)

Fig. 26, forceps of Limnophila ultima from below; outside, horny appendages are slightly hooked at the tip.

Fig. 27, forceps of Limnophila rufibasis from above, open; the appendages *aa* are large and strong, serrated inside; *bb* are also horny, and look like fig. 27*a*; the point *c* is directed upwards; 27*b* is a slender, horny organ, situated inside of the forceps, and concealed when it is closed; its structure is perhaps analogous to a similar organ in Dicanoptycha (fig. 12*a*); the same organ is more or less distinctly seen in almost all other species.

Fig. 28, forceps of Limnophila montana from above, closed; it is distinguished at once by the position of the appendages, which is peculiar to this species; *aa* are the tips of internal horny organs; they protrude, together with the soft part *f*, when the forceps are opened.

Fig. 28*a*, the same from the side; *a* is the same as in fig. 28.

Fig. 29, forceps of Symplecta punctipennis from above; *a* and *b* are horny.

Fig. 30, forceps of Arrhenica spinosa from above; *a* horny, *b* soft appendage; *cc* internal forceps, (fig. 30*a* represents it detached); at *d* is a joint, by means of which this forceps is opened or closed.

Fig. 31, forceps of Eriocera fuliginosa from above; *aa* are horny; *bb* soft; *c* is curved downwards, like fig. 27*b*.

Fig. 32, forceps of Amalopis inconstans, from above and half open. It is difficult to convey an idea of this organ by a drawing, the points *f*, *g* and *h* being all curved and directed upwards; *aa* are horny; *bb* soft; *cc* coriaceous, hollow inside; *h* is figured separately, (32*b*); the point *f* is bifid, (32*a*).

Fig. 33, forceps of Bittacomorpha clavipes from below.

Fig. 33*a*, the same, from above.

Fig. 34. forceps of Cladura flavoferruginea, from the side; *a* is convex and seems to be hollow inside; the concavity can be seen at *b*; *cc* is the forceps. This figure is a very rough sketch, drawn from a dry specimen and may not, for this reason, be quite accurate.

September 6th.

Mr. LEA, President, in the Chair.

Twenty-nine members present.

A paper was presented for publication in the Proceedings entitled "Catalogue of the Invertebrate Fossils of the Cretaceous Formation of the United States, by Wm. M. Gabb," and was referred to a Committee.

Mr. Lesley read the following extracts from a letter he had received from Mr. Edward A. Spring, Eagleswood, N. J., July 26th, 1859:

I was over on the South Amboy shore with a friend, walking in a swampy wood, where a dyke was made, some three feet wide, when we discovered in the middle of this ditch a large black spider making very queer motions for a spider, and on examination it proved that he had CAUGHT A FISH.

He was biting the fish, just on the forward side of the dorsal fin with a deadly gripe, and the poor fish was swimming round and round slowly, or twisting its body as if in pain. The head of its black enemy was sometimes almost pulled under water, but never entirely, for the fish did not seem to have enough strength, but moved its fins as if exhausted, and often rested. At last it swam under a floating leaf at the shore, and appeared to be trying, by going under that, to scrape off the spider, but without effect. They then got close to the bank, when suddenly the long black legs of the spider came up out of the water where they had possibly been embracing the fish, (I have seen spiders seize flies with all their legs at once) reached out behind and fastened upon the irregularities of the side of the ditch. The spider then commenced tugging to get his prize up the bank. My friend stayed to watch them while I went to the nearest house for a wide mouthed bottle. During the six or eight minutes that I was away, the spider had drawn the fish entirely out of the water, when they had both fallen in again, the bank being nearly perpendicular. There had been a great struggle—and now on my return, the fish was already hoisted head first more than half his length out on the land. The fish was very much exhausted, hardly making any movement, and the spider had evidently gained the victory, and was slowly and steadily tugging him up. He had not once quitted his hold during the quarter to half an hour that we had watched them. He held, with his head toward the fish's tail, and pulled him up at an angle of 45° by stepping backwards. How long they had been there or how far they had come we cannot tell. We saw no web anywhere about.

The time would not permit a longer stay, so we reluctantly bottled the pair. I thought I had missed dipping up the spider, and looked along the bank, but on turning to the bottle he was there. The fish was swimming weakly at the bottom of the water that I had dipped in, and the spider standing sentinel over him on the surface, turning when he turned, and watching every motion. We stopped the mouth of the bottle so that the spider could not escape, and went to see the fine place of the late Mr. Stevens above on the hill. Returning in about three hours, we found, to our disappointment, the spider dead at the bottom, but the fish was alive. He lived for twenty-four hours. The spider was ¾ of an inch long, and weighed 14 grains; the fish was 3¼ inches long and weighed 66 grains.

September 20th.

Mr. LEA, President, in the Chair.

Thirty-one members present.

The following papers were presented for publication in the Proceedings:

"Contributions to American Lepidopterology, by Brackenridge Clemens, M. D."

"Description of a deformed fragmentary Human Skull found in an ancient quarry cave at Jerusalem; with an attempt to determine by its configuration alone the ethnical Type to which it belongs, by J. Aitken Meigs, M. D."

September 27th.

Vice-President BRIDGES in the Chair.

Thirty-eight members present.

The Report of the Biological Department for the present month was read.

On report of Committees of the Biological Department, the paper entitled "On the seat of the vesicating principle of Lytta vittata, by Joseph Leidy, M. D.," was recommended for publication in a medical journal, and one entitled "Abstract of the most important points of Researches on the Minute Anatomy of the Liver, by H. D. Schmidt," was ordered to be published in the Proceedings.

On report of the Committee, the paper entitled "Catalogue of the Invertebrate Fossils of the Cretaceous formation of the United States, by Wm. M. Gabb," was ordered to be published with the Proceedings.

The following were ordered to be published in the Proceedings:

Contributions to American Lepidopterology.

BY BRACKENRIDGE CLEMENS.

TINEINA.

It is the intention of the writer to confine these contributions to Lepidopterology, to the description of species which are new to entomological history, or which are believed to be new. This plan dispenses with the necessity of general remarks on systematic arrangement, since but few species at a time will be given as the genera to which they belong are determined, or ascertained to be undescribed. Indeed I have nothing of value to add to what has been recently advanced elsewhere, nor has any question arisen in my studies of the present group, that would induce me to retract or doubt the accuracy of the views advocated, respecting the nature of a family. I do not wish, however, to be understood to assert that the group Tineina is synonymous with a family. I do not by any means entertain the belief that it includes only one, and yet I can perceive but little in the majority of the groups collected under this term, other than artificial assemblages of genera, under a family termination.

I find in the pterogostic characters of the perfect insect a similitude of structure which enables the investigator, with but little difficulty, to refer it to the appropriate principal group formed on this basis. The individuals, thus assembled together agree not only in *general structure*, but in embryonic histories and in larval forms, so far as my own observation and study of other fauna than our own has enabled me to determine the question. The agreement in embryonic form extends into the group Tortricina, and the relationship in the imago, is likewise expressed to a certain degree in the neuration of the wings of this latter group, as compared with that of the Tineina. These characters, however, are sufficiently marked in each, and can scarcely be mistaken in either instance

by one of ordinary powers of discrimination. Without, therefore, attempting to fix at present the limits and characters of the group, more definitely than by the wing structure, and rejecting the generic values usually assigned to it, except where there is characteristic variation, we will proceed to describe generic groups and their individuals.

TINEIDÆ.

Imago with the nervules of the anterior wings radiating chiefly from the posterior part of the disc, with four to five *subcosto-marginal nervules*, the first of which arises near the base of the wing, with two simple *disco-central nervules*, with the median nervure branching near its posterior extremity into three nervules, *medio-superior*, *central* and *posterior*, with the submedian fold well marked, and the submedian nervure simple and usually bifid toward the base. Posterior wings with bristle, with costal nervure simple, with subcostal usually simple, and attenuated toward the base of the wing, emitting a *discal nervure* from which arise *at least two disco-central nervules*, with median either bifid or trifid, with submedian fold and simple submedian nervure, and an internal fold or nervure.

TINEA Fabr.

Head free, as broad as the thorax, roughly haired above and in front. Ocelli none. Eyes hemispherical and salient. Antennæ simple, filiform, in the ♂ very slightly ciliated, tapering from the base, with joints closely set and striated, not so long as the anterior wings, and scarcely as long as the body. Maxillary palpi long, folded, five-jointed. Labial palpi cylindric, scaly, the second article with bristles, *especially at the apex above*, third article small and somewhat deflexed. Tongue very short, not as long as the labial palpi. Wings exceeding the tip of the abdomen; the *anterior* oblong-ovate, with moderate apical cilia; *posterior* ovate, clothed with scales, and with long cilia behind.

The following species are represented in my collection and may be tabulated as follows:

‡ A semi pellucid discal spot on under surface of fore wings.

† Fore wings without a dorsal streak.

Bifiavimaculella.—Dark brown, tinged with violet, with a very pale yellow costo-discal patch and one above interior angle.

†† Fore wings with a dorsal streak.

Dorsistrigella.—Dark brown, with a costo-discal very pale yellowish patch.

Crocicapitella.—Fuscous, with a discal yellowish spot.

‡‡ No discal spot on under surface of fore wings.

Carnariella.—Yellow-brown dusted with fuscous; a discal and two intermediate dark brown spots.

Lanariella.—Pale yellowish brown, or a silky pale yellow, with sometimes a brownish discal spot.

Nubilipennella.—Dark fuscous, dusted with dull yellowish.

Variatella.—Whitish, varied with dark brown, with white costal and dorsal spots.

Medio-superior and central nervules of fore wings arise on a common stalk; last branch of subcostal bifid.

T. bifiavimaculella.—Palpi pale yellowish, dark brown externally, antennæ dark fuscous, darkest toward the base. Head and front luteous. Thorax dark brown. Abdomen dark grey. Fore wings umber brown, tinged with a violet hue, especially toward the tip, where it prevails. On the middle of costa, a pale yellow, somewhat triangular patch extended to the disc, and a dorsal patch of the same hue at the interior angle; cilia dark colored, dotted on the posterior margin of the wing with pale yellow. Hind wings grey, with a brassy hue. Exp. al. 6.50 lines.

Imago, August, September.

Medio superior and central nervules branch from a common stalk.

T. dorsistrigella.—Labial palpi yellowish, dark brown externally, third article yellowish. Head and front very pale yellow, tinged with dark brown on the sides above the eyes, and at base of antennæ. Antennæ dull brown. Thorax dark brown, with the disk very pale yellow. Fore wings blackish brown, somewhat tinged with obscure reddish, with a dorsal streak along the inner margin, whitish or pale yellowish white, and usually somewhat dilated above the interior angle; with a costo-discal patch of the same hue and the costa punctated with pale yellowish atoms, which become small spots toward the apex of the wing, and on the posterior margin. Hind wings pale brownish, with a reddish hue; cilia gray. Exp. al. 4.75 to 6.00 lines.

T. crocicapitella.—Labial palpi yellowish, dark brown externally. Head and front saffron yellow. Thorax dark fuscous, with the disk saffron yellow. Fore wings dark fuscous, with dispersed saffron yellow scales, especially along the costa, with a saffron yellow dorsal streak and a paler, nearly round discal spot. Hind wings pale brownish gray. Exp. al. 4.50 to 6.50 lines.

T. carnariella.—Palpi dark brown. Head and front rather dark ochreous, tinged with reddish. Fore wings pale yellowish brown, dusted with fuscous, especially at the costal portion of the base; with a conspicuous dark brown spot on the end of the disc, with two smaller spots of the same hue between this and the base of the wing, one about the middle of the disc, and the other beneath it in the submedian fold; fringes unicolorous and rather paler than the general hue. Hind wings pale bluish gray; fringes somewhat darker. Exp. al. 5.50 to 7.50 lines.

This species, perhaps, may have been heretofore described under another name; but if it has, I have been unable to recognize it. I have two specimens only in my collection. The larvæ were found in one of my boxes of Lepidoptera, and had constructed cases of detached portions of the insects and the scales, united by silk. The imago appeared, one on March 13th, and the other some days subsequently.

The eggs were whitish, smooth and nearly cylindrical, but tapering slightly toward the upper end. Length about *one fourth* of a line, diameter one half the length. The *mature larva* was of a dirty white color, with a black head and black cervical shield.

T. lanariella.—Head ochreous. Labial palpi dark brownish. Antennæ dull fuscous. Thorax and abdomen pale yellow. Fore wings pale yellowish brown or pale yellow, with a silky lustre, and immaculate; sometimes slightly dusted with fuscous on the costa at the base, and with a brownish spot on the end of the disc. Hind wings pale shining yellow, cilia the same. Exp. al. 5.50 to 6.50 lines.

I am not sure this is not a variety of the previous species, and has, perhaps, been heretofore described, as it is a very common inhabitant of houses. The larvæ feed on woollen substances, carpets, clothes, etc., of which each constructs a case. I have reared a great many in confinement, and have also found that they feed on the bodies of their dead progenitors, when the opportunity offers.

I find the egg described in my note book as spheroidal and of large size for so small an insect; I doubt, however, the correctness of the term descriptive of the figure. The young larvæ appear after about two weeks, and do not immediately make a case. The *mature larva* is white, with a dark brown head and a cervical shield of the same hue. They reach maturity about the middle of March, and climb the sides of the walls to the ceiling of the room in which they feed, and suspend or attach their cases. The imagos of the first brood appear about the beginning of May; there is another in August and September.

T. nubilipennella.—Labial palpi yellowish, dark brownish exteriorly. Head and front dull fuscous or brownish yellow. Antennæ dull dark brown. Thorax brownish yellow. Fore wings deep fuscous, sprinkled with dull yellowish, with a yellowish spot on the inner margin at the base, and the middle of the inner margin tinged with the same hue; with a deep fuscous spot at the end of the disc and two others of the same hue rather indistinct, one in the fold beyond the middle, the other on the disc and a little posterior to it. Sometimes the dull yellowish hue prevails, freely dusted with deep fuscous, and with the spots more distinct than in the darker specimens. Hind wings bluish, shining gray, with the cilia of the same hue. Ex. al. 5.50 to 6.50 lines.

Imago on wing in September.

T. variatella.—Palpi pale yellow, blackish externally. Head yellowish white. Thorax gray, with tegulæ black, tipped behind with gray. Abdomen blackish. Antennæ blackish brown. Fore wings whitish, varied with dark brown and blackish; with a dark brown streak containing blackish scales, curving somewhat from the costa at the base to the fold; with a blackish brown spot on the fold, rather before the middle, slightly connected with one of the same hue nearer the base on the costa; with a dark brown, somewhat oblique patch about the end of the disc and one at the tip of the wing, and with the apical portion dusted with the same hue; a few white spots on the cilia of the inner margin, and on the costa *behind* the discal patch; *before* the discal patch are two well marked white spots on the costa, the one nearest the discal patch having a blackish central dot; the inner margin, toward the base, white, varied with dark brown striæ; cilia grayish. Hind wings dark brown, rather tinged with reddish, cilia the same. Exp. al. 5.5 lines.

Imago on wing in September.

XYLESTHIA.

Head roughly haired. Ocelli none. Eyes round, visible in front. Antennæ filiform, with whorls of scales on each article, and the basal joint with a tuft of scales in front that conceals it, not as long as the body and about one-half as long as the fore wings. Maxillary palpi very short, scaly and concealed beneath the labial palpi. Labial palpi cylindric, with a tuft of hair beneath, and with lateral bristles; the *third article* smooth and quite short. Tongue not quite as long as the palpi. Wings exceeding the body; the anterior oblong ovate, *with elevated tufts of scales;* the posterior ovate, with the costa excavated at the insertion of the costal nervure.

X. pruniramiella.—Antennæ yellowish white. Palpi and head hoary. Thorax hoary, dusted with brownish. Abdomen dark brown. Fore wings blackish brown and luteous brown, somewhat varied with whitish, with patches of elevated scales at the base and along the fold; with an indistinct whitish band crossing the middle of the disc, one nearer the base still fainter and one about the end of the disc, with a white dorsal spot at the inner angle and a whitish streak from the costa above it, with another whitish costal streak between this and the tip; a blackish spot at the tip white margined before; cilia brownish, white at the dorsal spot. The luteo brownish hue usually prevails toward the tip of the wing and sometimes the whitish markings are indistinct. Hind wings dark brown, somewhat tinged with reddish, cilia the same. Exp. al. 6 to 6.5 lines.

The larva of this insect feeds on the woody excrescences found on the branches of the plum tree. These nodose tumors have recently attracted the fruit-grower's attention, but I am unable to say whether the larva is the cause of the disease. It does not confine its operations to the cortical portion of the node, but bores the wood likewise. I have found it associated with another much larger larva, but the imago of the only specimen I received, escaped

from the vivarium before I saw it. Both pass the winter in the larval state, and may be taken in recent excrescences, during the latter part of April or the beginning of May, and become imagos in June. The larva is dirty whitish in color, with a brown head and shield, and scarcely one-half an inch long; the larger larva is quite an inch in length, with no distinctive markings. Prunira mielea makes its cocoon of "frass" and silk in a gallery formed in the wood, but near the surface. The pupa has minute spines on the dorsum and is thrust from the cocoon at maturity.

The following species, I believe, forms a new genus. It is rather rare, at least I have met with the imago but few times. I know nothing of its embryonic states. In appearance the imago bears considerable resemblance to the figures of Euplocamus Boleti of Europe, but its generic characters separate it from the latter very distinctly.

ANYDRIA.

Head free, as broad as the thorax, roughly haired, (the hairs of the front ascending and those of the vertex inclined from each side toward the median line, or having a stelliform arrangement behind the antennæ.) Ocelli none. Eyes small, hemispherical and salient. Antennæ simple in both sexes, moderately thick, with joints closely set and with whorls of scales, *one-half* as long as the fore wings and scarcely two-thirds as long as the body. Maxillary palpi extremely small and 2-jointed. Labial palpi with the *second article beneath hairy and formed like a brush;* the third, slender and ascending. *Tongue wanting.* Wings narrow, much exceeding the tip of the abdomen; the anterior, elliptical, cilia rather long, especially at the inner angle, giving the wing the appearance of being angulated; posterior, obtusely ovate, with moderately long cilia behind.

A. effrentella.—Labial palpi yellowish brown, with the second article dark brown exteriorly. Head and front yellowish brown. Thorax dark brown, varied with yellowish. Fore wings fuscous, varied with yellow, which prevails along the inner margin, with fuscous spots around the apical margin, and in the ♀ a large discal fuscous patch. The fore wings of the ♂ have more of the yellowish hue than the ♀; cilia yellowish. Hind wings pale brownish yellow, cilia the same. Exp. al. 8 to 11 lines.

The following species likewise form a new genus, at least I am not aware that any has been formed into which they can be received. Plumifrontella is found here in June and July, when it may be taken at light. I am unacquainted with the embryonic history of the species described, and have never met with the female Plumifrontella. The genus, I think, belongs to the group Exapatidæ, and as the females in some of the genera are apterous, that of Plumifrontella may be unsupplied with wings. The antennæ should be examined very carefully, otherwise their peculiar structure will be overlooked and mistaken for simple, filiform organs.

ANAPHORA.

Head hairy, concealed by the labial palpi in the ♂, free in the ♀. Ocelli none. Eyes small. Antennæ but little longer than the thorax, *serrated beneath, with the ends of the articles finely ciliated.* Maxillary palpi moderately long, scaly and 3-jointed in both ♂ and ♀. Labial palpi in the ♀ greatly developed, ascending and thrown back on the dorsum of the thorax, which they equal in length, the first article scaly, arctate and equal, to the superior margin of the eyes, and the two succeeding ones equal and furnished with abundant spreading hairs; in the ♀ short, not ascending above the eyes, articles nearly equal, the first and second hairy beneath, the third rather smooth and porrected. *Tongue wanting.* Wings exceeding the tip of the abdomen; the *anterior* with costa nearly straight, hind margin obliquely convex, inner margin nearly

straight, but slightly emarginate above the interior angle; the *posterior* ovate, and both with rather short cilia.

Species.

‡ Fore wings with two short dark brown streaks at the base of the fold.

P o p e a n e l l a.

‡‡ Fore wings with no basal streaks.

Labial palpi in the ♂ as long as thorax.

P l u m i f r o n t e l l a.—Rubescent, mixed with maroon brown.

Labial palpi in the ♂ not recurved on thorax.

A r c a n e l l a.—Dark brown, with a purplish hue; luteous brown in the fold.

A. p l u m i f r o n t e l l a.—Labial palpi reddish brown. Thorax dull brown tinged with reddish. Fore wing rubescent and maroon brown intermixed, the former hue prevailing along the fold, at the base along costa and disc, dusted with dark brown; with a dusky or dark brownish spot on the end of the disc, one about the middle of the fold and another near the base. In some specimens these spots are quite indistinct. Hind wings dusky brown. Exp. al. 17 lines.

Female not known.

All my specimens of the following species are much faded from exposure. The specific description will not therefore apply accurately to the insect as it is found in nature.

Antennæ of the ♂ distinctly serrated beneath.

A. P o p e a n e l l a.—Labial palpi dark brownish, whitish ? at the tip in the ♀. Thorax dull brownish in the ♂, with the tegulæ tipped behind with gray; whitish ? tinged with brown in the ♀. Fore wings brownish luteous or dull reddish brown, with luteous or yellow along the fold and inner margin, a spot on the disc and one on the middle of the nervules of the same hue, with a dark brown spot between them; a dark brown spot on the fold beneath median vein, most frequently semicircular, with a short, dark brown streak at the base on the submedian vein and another parallel to it beneath the median. The anterior margin striated from the costa with dark brown, with a subterminal row of dark brown spots *above the branches of the median vein*, and the ends of the nervules dotted with the same hue; cilia pale yellowish brown. Hind wings brownish yellow, cilia the same. Exp. al. 12 to 18 lines.

Male and female alike.

From Smithsonian Institution. Capt. Pope's collection in Texas.

Labial palpi shorter in the ♂ than in the preceding; ascending, but not recurved.

A. a r c a n e l l a.—Palpi luteous brown in front, dark brown externally. Thorax dark brown, almost blackish. Fore wings dark brown, with an obscure purplish hue; with luteous brown on the disc and in the fold, interrupted by a blackish brown, nearly square, submedian spot in the fold and a small one near its base of the same hue—sometimes merely a few blackish brown scales—with an irregular blackish brown spot on the end of the disc, and the costa and apical portion of the wing dusted and dotted, sometimes striated with blackish brown. Hind wings dark brown, tinged with blackish. Exp. al. 12 lines.

Female not known.

The genera here described may be distinguished from each other by the following table:

Head rough.

† Palpi cylindric, second joint with bristles above.

Tinea.—Antennæ striated; maxillary palpi folded, 5 to 6-jointed; tongue scarcely as long as labial palpi; no naked space around the eyes.

†† Palpi tufted beneath.

Tongue wanting.

Amydria.—Joints of antennæ with whorls of scales, not tufted at base; third joint of palpi rather long, ascending.

Tongue nearly as long as the labial palpi.

Xylesthia.—Joints of antennæ with whorls of scales, tufted at base; fore wings with raised tufts.

††† Palpi hairy beneath in the ♀, reflexed and very long in the ♂.

Antennæ serrated beneath in both ♂ and ♀.

Anaphora.—Tongue obsolete; fore wings not pointed.

Explanation of Plate.

Genus Tinea, fig. 1. The head of T. crocicapitella; 1*a*, a portion of antenna; 1*b*, the anterior and posterior wing of T. lanariella.

Genus Xylesthia, fig. 5. The head of X. pruniramiella; 5*a*, a portion of antenna; 5*b*, the anterior and posterior wings.

Genus Amydria, fig. 2. The head of A. effrentella; 2*a*, a portion of antenna; 2*b*, the anterior and posterior wings.

Genus Anaphora, fig. 3. The head of A. plumifrontella the ♂; 3*a*, a portion of antenna; 3*b*, the anterior and posterior wings. Fig. 3′. The head of A. Popeanella the ♀; 3′*a*, a portion of antenna of the ♂.

Description of a deformed, fragmentary Human Skull, found in an ancient quarry-cave at Jerusalem; with an attempt to determine by its configuration alone the Ethnical Type to which it belongs.

BY J. AITKEN MEIGS, M. D.

In September, 1857, Mr. J. Judson Barclay kindly presented to the Academy a fragmentary human cranium discovered by him in an immense quarry-cave at Jerusalem.

The location in which this skull was found, the circumstances attending its discovery, and the very peculiar form which it exhibits, in consequence of the perpendicular flatness of the occiput, render it highly interesting to the craniographer.

From a communication* which appeared in the *Ladies' Christian Annual* for May, 1855, and a letter dated Philadelphia, Aug. 21st, 1857, addressed to the writer by Mr. Barclay,† I gather the following interesting particulars concerning the finding of this skull.

Having received some information of the existence of a very extensive cave near the Damascus gate of Jerusalem, (entirely unknown to Franks,) Mr. Barclay, in conjunction with his father and brother, resolved upon its exploration. Accordingly, having obtained permission to this effect, from the Nasir Effendi, they repaired to the cave, the mouth of which is situated directly below the city wall, and the houses on Bezetha. They found the wall at this spot about ten feet in thickness. Through a narrow, serpentine passage which traverses it they gained an entrance into the cave. The length of the cavern they estimated

* Entitled, "Extract from a Journal kept by R. G. B., during a three years' residence in Jerusalem." See also "The City of the Great King; or, Jerusalem as it was, as it is, and as it is to be." By J. T. Barclay, M. D. Philada. 1858, p. 458.

† See Proceed. Acad. Nat. Sci. for Sept. 1857, p. 177.

at seven hundred and fifty feet, and the circumference upwards of three thousand feet. The roof is supported by numerous regular pillars hewn out of the solid limestone rock. The floor from the entrance to the termination forms an inclined plane, the descent of which is in some places very rapid. About 100 feet from the entrance a very deep and precipitous pit was discovered containing a human skeleton; supposed to be that of some unfortunate who had fallen headlong down and broken his neck, or rather his skull, judging from the fracture which it exhibits. The bones, of almost giant proportions, gave evidence, from their decayed state, of having remained in that position for many years. The skull, unlike the rest of the skeleton, was in a remarkable state of preservation. Numerous crosses on the wall indicate that the devout Pilgrim or Crusader had been there; and a few Arabic and Hebrew inscriptions—too much effaced to be deciphered—prove that the place was not unknown to the Jew and the Arab. The explorers found many intricate, meandering passages leading to immense halls as white as the driven snow, and supported by colossal pillars of irregular shape; some of them placed there by the hand of nature, others of them evidently by the stone quarriers to prevent the intumbling of the city. From their explorations the party concluded that this cavern and the Grotto of Jeremiah, two or three hundred yards distant, originally constituted one immense cave which was formerly the great quarry of Jerusalem.

The cave appears, therefore, to be a very old one. An allusion to it under the name of the "Cotton Grotto" is made by Kadi Mejr-ed-din in an Arabic MS., entitled "The Sublime Companion to the History of Jerusalem and Hebron," and bearing date, A. D. 1495. A gentleman who entered the cave subsequently to the visit of the Messrs. Barclay, tells us, in the "Boston Traveller," that though its existence was long suspected, "nothing was positively known regarding it, as it has been kept carefully closed by the successive governors of Jerusalem. The mouth of the cavern was probably walled up as early as the times of the crusades, to prevent its falling into the hands of a besieging army; earth was thrown up against this wall, so as effectually to conceal it from view, and it is only upon the closest scrutiny that the present entrance can be perceived." Piles of stone chippings, and blocks of stone but half-quarried, and still attached by one side to the rock, were encountered in different parts of the cave. The marks of the cutting instruments were as plain and well-defined as if the workman had but just ceased from his labor. Those who visited the cave were of the opinion that it had been worked as a quarry during the days of Solomon. The following reasons appear to favor this opinion. The stone is the same as that of the portions of the Temple wall still remaining, and referred by Dr. Robinson to the period of the first building. From the former entrance of the cave to the Temple area is a gently inclined plane—a fact that suggests a satisfactory solution of what has heretofore been regarded as a very puzzling question—the difficulty of placing such immense masses of rock *in situ*, as those found at the south-east and south-west corners of the Temple wall. The heaps of chippings which lie about show that the stone was dressed *on the spot*, which accords with the account of the building of the Temple. To these reasons we may also add the extent of the quarry, the amount of stone which must have been worked out there, the size of some of the blocks themselves, the extreme age of the part which has been exposed to the action of the elements, and which dates back in legends and traditions to the time of Jeremiah, the fact that there are no other quarries of any great size near the city, and especially the fact that in the reign of Solomon this quarry, in its whole extent, was *without the limits of the city*.

In the absence of any positive evidence to be derived from the skull itself, these statements are introduced here as being calculated to throw some light upon the question of its antiquity or modernness, and consequently, to a certain extent, its nationality.

The cranium found in this cave (No. 1031 of the collection) is probably that of a man ætat. about 40 or 45 years. In structure it is moderately dense and heavy, and from its general appearance would scarcely be regarded as an ancient skull. It is, unfortunately, in a very fragmentary condition, consisting of the two ossa parietalia, the left temporal, nearly all that part of the os occipitis posterior to the foramen magnum, and enough of the frontal bone to determine the calvarial form. The facial, right temporal and basal bones are altogether wanting. It has evidently been a short, broad and high skull. The coronal region is triangular in shape, with the truncated apex of the triangle directed anteriorly and coinciding with the frontal diameter. The skull belongs therefore to the Triangular Type of the Class Brachyplatupsidæ—the 25th in the new and complete classification of human crania, which I propose to bring before the Academy at some future time. The bi-frontal diameter measures about 4 inches; the bi-parietal, between the ossific centres, $6\frac{1}{8}$ inches; the vertical diameter, from the posterior edge of the foramen magnum to the highest point of the crown directly above, $6\frac{3}{8}$ inches; the intermeatous diameter about $2\frac{1}{2}$ inches. The antero-posterior or longitudinal diameter of the head must have measured about $6\frac{1}{2}$ or $6\frac{3}{4}$ inches. The occipital bone rises vertically from the posterior margin of the great foramen to meet the parietalia which bend abruptly downward between their lateral protuberances. This striking peculiarity gives to the posterior part of the head the same broad, high and perpendicularly flattened appearance, so characteristic of Peruvian Crania. The superior transverse ridge of the occipital bone is well-defined; and the occipital protuberance sharp and prominent. The mastoid process of the temporal bone is large and massive.

Upon the inner surface of the left side, and directly opposite the parietal centre of ossification, there is a solution of continuity in the vitreous table. Both the vitreous and diploic structures at this spot have decayed away or been absorbed, leaving a cavity of an irregularly oval shape, and about five-eighths of an inch long, and half an inch wide. Judging from several minute fissures which radiate in different directions from the edges of this cavity, the latter is the result of a blow, which, without affecting the outer or fibrous, has been strong enough to fracture the inner table. A portion of the surrounding surface of the skull, extending about one inch from the margin of the cavity, is stained of a reddish or iron-rust color.

The muscles attached to the sharp external occipital protuberance, to the well pronounced superior and inferior semi-circular lines or ridges of the os occipitis, and the intervening rough surface must have been well developed, so that the nape of the neck formed, in all probability, a plane continuous with the back of the head. When with this peculiarity we couple the fact that, owing to the relative position of the external auditory meati, the ears must have appeared to be attached rather to the back part than to the sides of the head, we can readily imagine that the individual to whom the skull belonged must have presented quite a bizarre appearance. The glenoid fossa of the left side remains intact and is especially worthy of notice, since it happens to constitute in this skull the only connecting link or point of attachment between the calvaria and the missing bones of the face. If the Cuvierian law of the correlation or harmonization of forms could be practically applied to the separate pieces composing the human cranium, this fossa would assume a still greater importance, since by means of it the outline of the bony face could be determined, and the observer having, in this indirect way, obtained an exact idea of the shape of the entire head, could proceed more confidently to indicate the precise ethnic type of which this skull is a specimen.

Impracticable, however, as this is, we can approximate the desired information by observing attentively the exact appearance of this fossa. The zygomatic tubercle is well marked; the eminentia articularis, instead of being flatly rounded, as is ordinarily the case, is sharp and well defined, while the anterior

wall of the glenoid cavity is thick and unusually convex. Instead of shelving backwards and upwards from the articular eminence, as is usually the case, particularly, as I am inclined to think, in long heads, it rises abruptly and almost perpendicularly, giving the fossa somewhat the appearance presented by this cavity in the carnivora, and indicating powerful up and down movements of the lower jaw, with diminished lateral action. The lateral motion of the jaw must have been still more restrained by the backward inclination of the internal end of the inferior root of the zygoma. The condyle adapted to such a fossa must have been large and heavy, with a correspondingly short and thick neck. Such characters indicate a heavy, square jaw, with short rami and a flattened or retracted symphysis menti. Corresponding with this, as the head is brachykephalic, the superior maxilla must have been heavy and flat and the malar bones prominent. Reasoning thus we may infer from the glenoid cavity that the face of this skull partook of the Tschudic or even approximated the Mongolian form.

It is, perhaps, impossible to say positively whether this skull be a very old or quite a modern one. A knowledge of the precise epoch to which it should be referred, would assist somewhat in the determination of its nationality. I have already said that from its appearance it can scarcely be regarded as an ancient skull. Yet the appearance and degree of density of bones are by no means reliable criteria of their age; for it is well known that bones of the same age exhibit great dissimilarity in these respects, according to the location in which they have been deposited, according as they have been buried in the ground, deposited in caverns, submerged in water, or freely exposed upon the surface of the earth to air and light. The quantity and quality of the mineral and saline matters contained in the water in which such bones may have been placed, the nature of the soil in which they may have been inhumed, and other circumstances, are known to exert, in the course of time, peculiar changes in both the animal and earthy matter. But the data by which to determine with certainty the time required to produce such changes are wanting. Equally recent bones deposited in the same cave at the same time often exhibit very different appearances after the lapse of many years. And yet the circumstances of location, and the absence or presence of animal matter, are the only, and, it must be confessed, very unreliable criteria by which to determine the age of bony remains. A piece of the Jerusalem skull pressed against the tongue adheres slightly. A small fragment was pulverized, treated with ether, washed and thoroughly dried by exposure to a gentle heat. One drachm of the bone thus treated was macerated in a mixture consisting of three parts water and two parts hydrochloric acid. In eleven hours it was thoroughly dissolved, the solution being accompanied at first with a moderately active liberation of carbonic acid gas. A few pellicles of a gelatinous matter that had collected upon the surface of the liquid were removed and carefully dried. They weighed 11 grains. Sulphuric acid was then added to the liquid drop by drop until there was no longer any precipitation of lime. The supernatant liquid was poured off, and the sulphate of lime effectually dried by exposure to the sun and afterwards to the heat of an oven. It weighed 48 grains. One grain of the original weight was thus lost in the process. From this rough analysis it will be seen that the bones composing the skull under consideration contain a less percentage of animal and a greater percentage of calcareous matter than is contained in decidedly recent bones. A piece of an ancient Burgundian skull, reported to be some 2000 years old, a fragment of the skull of an ancient Roman, found in the tomb on the road between Cumæ and the ruins of Baiæ, and a fragment of the skull of a young aboriginal female taken from an ancient tomb at Ticul in Yucatan, were subjected to the same analytical process. They were found to consist almost wholly of earthy matter. The animal matter had almost entirely disappeared. These bones were dissolved in a much less time than the piece from the Jerusalem skull, and their solution gave rise to a very active formation and escape of gas.

1869.]

Great interest attaches to this skull on account of the fact that it presents an excellent opportunity to test the differential value of certain craniographic characters,—those pertaining to the crown, occiput and temporal region. The true value of craniographic criteria has not yet been settled. The special investigations in this branch of natural science are as yet too limited, and many of them have been undertaken in such a hasty and unphilosophical spirit, and with such imperfect views of the method that rules in craniography, that the generalizations thus far effected are not only few in number and of limited application, but have to be used in the most careful and discriminating manner. It is well known to the members of the Academy that a skull in the collection marked Phœnician* was sent by M. Fresnel, the celebrated archæologist, to the late Dr. Morton, without the slightest information as to where, or the circumstances under which it was found. After a careful study of its race characters, Dr. M. pronounced it to be a Phœnician. He afterwards learned from Fresnel that it was found in the sepulchral cave of Ben-Djemma, in the Island of Malta, and probably belonged to an individual of that race, which, in the most remote times, had occupied the northern coast of Africa and the adjacent isles.† It will thus appear that Dr. M., guided by osteologic characters alone, was enabled to announce the correct geographical locality of this skull, and perhaps also its true ethnic value, though of this latter point I entertain, at present, some doubts, arising from the remarkable resemblance which this skull bears to that of a wandering Chingán of Transylvania, depicted in Blumenbach's Decades (Tab. ii.) In like manner, some time before his death, Dr. Prichard sent to Prof. Retzius two human crania, requesting an opinion as to the race to which they belonged. He pronounced one of them to be Roman and the other Celtic, and was informed by Prichard that he was in all probability correct, for the two skulls had been dug up in an old battle-field at York, England, where the ancient British Celts, the Belgæ Brittanorum, had been vanquished by the Romans.‡ Another instance, similar to these, will presently be referred to. With such examples before me, I have been led to attempt, as far as the materials at my command would allow, to identify ethnically the skull from Jerusalem. It will be borne in mind that Drs. Prichard, Morton and Retzius had entire skulls submitted to them. The skull from Jerusalem, on the contrary, is, as we have just seen, in a very fragmentary state. It may be said that the knowledge of the locality in which this skull was found would assist materially in this investigation. But that this is not the case will at once be seen when we call to mind that this locality has been, for centuries, a great rendezvous for many races of men, coming from various parts of Europe, Asia and Africa. Moreover the skull is somewhat unique, not only in its form, (of which there is not the exact counterpart in the whole Mortonian collection,) but also in the fact that none others were found with it. Desirous of ascertaining whether any other skulls, similar in form to the one under consideration, had been discovered in Palestine, I examined a number of works of travel. At length, in the second volume of such a work published at Dublin in 1840, and entitled "Narrative of a voyage to Madeira, Teneriffe, and along the shores of the Mediterranean, by W. R. Wilde, M. R. I. A., &c.," I came across a curious account of the discovery of some human skulls in one of the ancient tombs near Jerusalem.§

During his sojourn in Jerusalem Dr. Wilde learned that within the ground denominated Aceldama, or Field of Blood, (situated to the south of Mt. Sion,

*See Catalogue of Human Crania, p. 28.

†See Patterson's Memoir of Morton in Types of Mankind, p. xl.

‡Blick auf den gegenwärtigen Standpunkt der Ethnologie in Bezug auf die Gestalt des Knöchernen Schädelgerustes. Von Prof. A. Retzius, Berlin, 1857, p. 6.

§A short notice of these crania is also contained in the Edinburgh Phrenological Journal, vol. 14, p. 217.

in the Valley of Hinnom, and close to the Mount of Offence,) and in the neighborhood of the painted chambers and the excavation called the tomb of Isaiah, some Arabs had accidentally discovered the doorway of a tomb carved out of the solid rock and concealed by a heap of rubbish, over which the soil had accumulated so as completely to hide the entrance. The doorway represented a Doric pediment, supported by rude pilasters, with some remains of floral embellishments, characteristic of Hebrew sculpture, carved upon the architrave. The interior of the tomb consisted of an oblong hall, cut with great precision out of the rock, and having at the inner end and on each side, a number of doors leading into small, oblong chambers or crypts, about seven feet long. On each side of these crypts was a trough or sarcophagus, hewn out of the solid rock, and filled with confused heaps of human bones in an astonishing state of preservation. Each set of crypts contained the skulls of distinct races of mankind. Dr. Wilde secured four of these crania, carried them to Europe, and through Dr. Graves of Dublin, sent casts of them to Dr. Prichard for examination. All the crypts on the right hand side of the tomb contained dense, heavy crania of a long, narrow form, with a flat, recedent forehead, very well marked superciliary ridges, and a prognathous superior maxilla. They evidently belonged to the African type. The skulls in the left hand crypts were of a shape the very reverse, as shown in plate 2, fig. 4 of Dr. Wilde's lithographic illustrations. "Although this skull," says the Dr., "differs in some respects from the true Mongolian, yet under that variety it must be classed. Its most striking character is its very remarkable narrowness in its longitudinal diameter, not only in contradistinction to the Ethiopian, which is characterised by extensive length, but in comparison with all other known crania. *It has an uncommon breadth and flatness of the occipital or posterior region;* and the very remarkable protuberance at the top of the head gives this skull a place among those termed pyramidal." Dr. Prichard regarded this skull as of Turkish origin, approaching the true Mongolian type more closely than any other. Dr. Wilde considers it probable that the skull appertained to some of the Turcoman tribes which still wander in hordes over the countries anciently named Parthia, Mesopotamia, Cappadocia and Pamphylia.

From the above description it will be seen that this skull resembles the fragmentary cranium from Jerusalem. The two appear to belong to closely related types or forms, as may be demonstrated by comparing the fragment under consideration with the drawing given by Dr. Wilde. The form shown in the latter is not the true Turkish as Dr. Prichard supposed. Had he compared Dr. Wilde's specimen, as I have Mr. Barclay's, with the skull of a Turk figured by Blumenbach, (Table 2,) he would have seen that though alike in the shortness of the longitudinal diameter, they are too dissimilar in the configuration of the occiput to be regarded as specimens of the same cranial type. It must be borne in mind, however, that Dr. Prichard frequently used the term "Turkish" as synonymous with Mongolian. Into this too comprehensive use of the term he appears to have been betrayed, in consequence of having adopted the questionable opinion of Remusat, Klaproth and Ritter, that the Turks are not a distinct people, *ab origine*, but descendants of the Hiong-Nu, who, anterior to the Christian era, threatened to overrun and subjugate China with their mighty hordes.* Domalius D'Halloy† and Latham‡ assign to the Turks a Scythic origin. The latter expressly says that he considers the Mongoliform physiognomy to be the rule with the Turk and not the exception, and that the Turk of Turkey exhibits the exceptional character of his family. I can find no good reason for thus confounding the Mongolians proper with the

* Nat. Hist. of Man, p. 290.
† Des Races Humaines, Paris, 1845, p. 84.
‡ Varieties of Man, pp. 78–9.

Turks. Judging from the figure in Blumenbach's Decades, above alluded to, the Turks are craniographically distinct from the Tartars and the Kalmucks, and should be regarded, as I have elsewhere maintained,* as an originally peculiar race, standing mid-way between the European and the Mongol, with which they are transitionally connected by sub-types, which have resulted from a double amalgamation on the part of the Turk, whose genealogical impurity we know to be very great. In the absence of Turkish crania in the collection, I am not able to speak positively upon this subject. In the Museum of the Army Medical Department, Fort Pitt, Chatham, England, there are two skulls obtained from the Turkish burial ground at Scutari. These are described by Dr. Williamson, in the following words: "No. 18. Cranium large, round, and very capacious; forehead high; vertex high, and very well arched; occiput rounded; space for the downward development of the cerebellum considerable; nasal bones well arched. No. 19. Cranium very large and capacious, and exceedingly well arched; forehead high and broad; vertex high, and occiput well rounded; facial bones well placed; the alveolar processes perpendicular, and the facial angle very high; lachrymal canal large."† The Turkish cranium is nearly globular, and though the external, occipital protuberance is but little developed, yet the occiput as a whole is rounded, and not vertically flattened as in Dr. Wilde's specimen, and the fragment found by Mr. Barclay. The latter is therefore not Turkish. Neither is it Jewish, for the Semitic skull, judging from the specimens in the collection of the Academy, is a long oval in form. Thus No. 842, the skull of a Theban Hebrew, ætat. 40 years,‡ belongs to the dolicho-kephalic class of Retzius. The crown is oval in shape, and the occiput regularly rounded. Nos. 818, 845, 865 and 870 exhibit the same general form, as may be seen by referring to the lithographic representations of these skulls in the Crania Ægyptiaca of Morton.§ No. 807‖ is an oblong and somewhat angular head, with a perceptible flatness of the basal portion of the occiput, which renders the occipital protuberance apparently more prominent than in the other skulls of this group. No. 879,¶ though preserving the oval configuration, is not so long a head as the others. In the 28th and 34th Tables of the Decades Craniorum, Blumenbach figures two Jewish skulls,—one of a young person and the other of a centenarian. Unfortunately they are represented neither in profile nor in posterior view, and it is impossible, therefore, to determine satisfactorily the shape of the occipital region, or even the general form of the skull. In describing the physical characters of the Semitic Atlantidæ, (Arabians, Jews and Kaldani or Syrians of Kurdistan,) Latham says that these people possess "dolikhokephalic capacious crania, with straight or prominent nasal and orthognathic maxillary profiles."** In another place he says that the cranium of the Jew differs from that of the Arab in its greater capacity.†† Dr. Williamson describes a "Skull from the Jews' burial ground, on the road to Kollalie," in the following terms: "Forehead low and and receding; posterior part of the cranium large compared to the anterior; superciliary ridge high and

*Cranial Characteristics of the Races of Men in Indigenous Races of the Earth, Philada., 1857, pp. 273–4.

†Observations on the Human Crania contained in the Museum of the Army Medical Department, Fort Pitt, Chatham. By George Williamson, M. D. Dublin, 1857, p. 80.

‡Figured in Crania Ægyptiaca, Plate 11, fig. 2. This drawing very accurately represents the skull in question. The reduced wood-cut in the *Catalogue of Human Crania in the Collection of the Academy*, (p. 34) is an inexact copy of this drawing. The outline of the posterior part of the head is drawn inaccurately.

§Plate 5, fig. 4; pl. 12. figs. 1, 2; pl. 6, fig. 2; pl. 6, fig. 8.

‖Pl. 2, fig. 8.

¶Pl. 8, fig. 2.

**Nat. Hist. of the Varieties of Man, London, 1850, p. 511.

††Ibid, p. 514.

very prominent; nasal bones arched with a depression at their root.* Hamilton Smith on the other hand speaks of the "beautiful spherical cranium of the Jews, as fine as the Arabian or Circassian;"† and in a recent work on the *Condition of Women and Children among the Celtic, Gothic and other nations*, it is asserted that the "Jews have, generally speaking, crania like the Saxons and Goths—short and broad," p. (69). This statement is certainly erroneous. The Jewish crania in the Academy's collection are, as we have just seen, long and ovoidal, with a comparatively receding forehead, and as Morton long ago observed, a strong and often harsh development of the whole facial structure. In his interesting work, entitled *Discoveries in the Ruins of Nineveh and Babylon*, Layard figures a bas-relief disinterred from Sennacherib's palace at Kouyunjik, and representing certain Jewish captives from Lachish. "These captives," he says, "were undoubtedly Jews, their physiognomy was strikingly indicated in the sculptures." A glance at these figures is sufficient to show that they belong, not to the short, but the long-headed races of men. The Jews are justly classed, therefore, by Retzius among the Asiatic Dolichokephalæ.‡

The Arab skulls in the collection, with the exception of No. 780, are entirely different from the fragment under consideration. No. 1296 is an oval, dolicho-kephalic head. No. 781 is an oblong head with the occipital region flattened superiorly, as in the Norwegian and Swedish§ skulls, and the occipital protuberance quite prominent. No. 784 is a long head approximating the oval form. Behind the mastoid processes it is quite broad, and the occipital region is full and rounded. No. 780 is a shorter head than the other. The crown exhibits the triangular form of that of the fragments from Jerusalem, but the triangle is longer. The occiput though flattened is not so decidedly flat as in the fragment.

This fragment differs also entirely from the Fellah skulls in the collection, not only in length but also in the configuration of the crown and the occiput.

Upon comparing it with the series of Egyptian skulls, I find that we cannot ascribe to it an Egyptian origin. It is a curious fact, however, and one worthy of mention in this connection, that among the figures in Crania Ægyptica, selected from Rosellini's great work by Dr. Morton to illustrate the Egyptian type of head, there are several which I am strongly inclined to think are not at all Egyptian. Two of these (Fig. 4, p. 34, and Fig. 3, p. 35) are evidently brachykephalic heads. In both, the hind head is vertically flattened. The former resembles the square or round-headed German, the latter calls to mind the Peruvian form. The first outline is that of the Harper in Bruce's tomb at Thebes; the second is a cook, who in the tomb of Rameses the Fourth, at Thebes, is represented with many others in the active duties of his vocation.

Before proceeding further in the attempt to determine the race to which the Jerusalem skull belongs, it will be useful to enumerate the very different races of men that have at different times occupied Jerusalem and its vicinity.

From the Acts of the Apostles we learn that during the first century of the Christian era, there were assembled at Jerusalem, besides the Jews, Parthians, Medes, Elamites, Mesopotamians, Judeans, Cappadocians, natives of Pontus, Asia, Phrygia, Pamphylia, Egypt, Libya about Cyrene, Rome, Crete and Arabia. Long after this we know that crowds of pilgrims were attracted to Jerusalem "from the shores of the Atlantic Ocean, and the most distant countries of the East." Among these pilgrims, Jerome, cited by Gibbon,‖ mentions the Britons and the Indians. Three centuries later, (A. D. 614,) the Holy

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*Op. Cit. p. 80.

†Nat Hist of the Human Species. Amer. Edit. p. 377.

‡Opusc. cit. sup. p. 9.

§See Catalogue of Human Crania, pp. 19, 20. Also Cranial Characteristics of the Races of Men in Indigenous Races, pp. 290, 291.

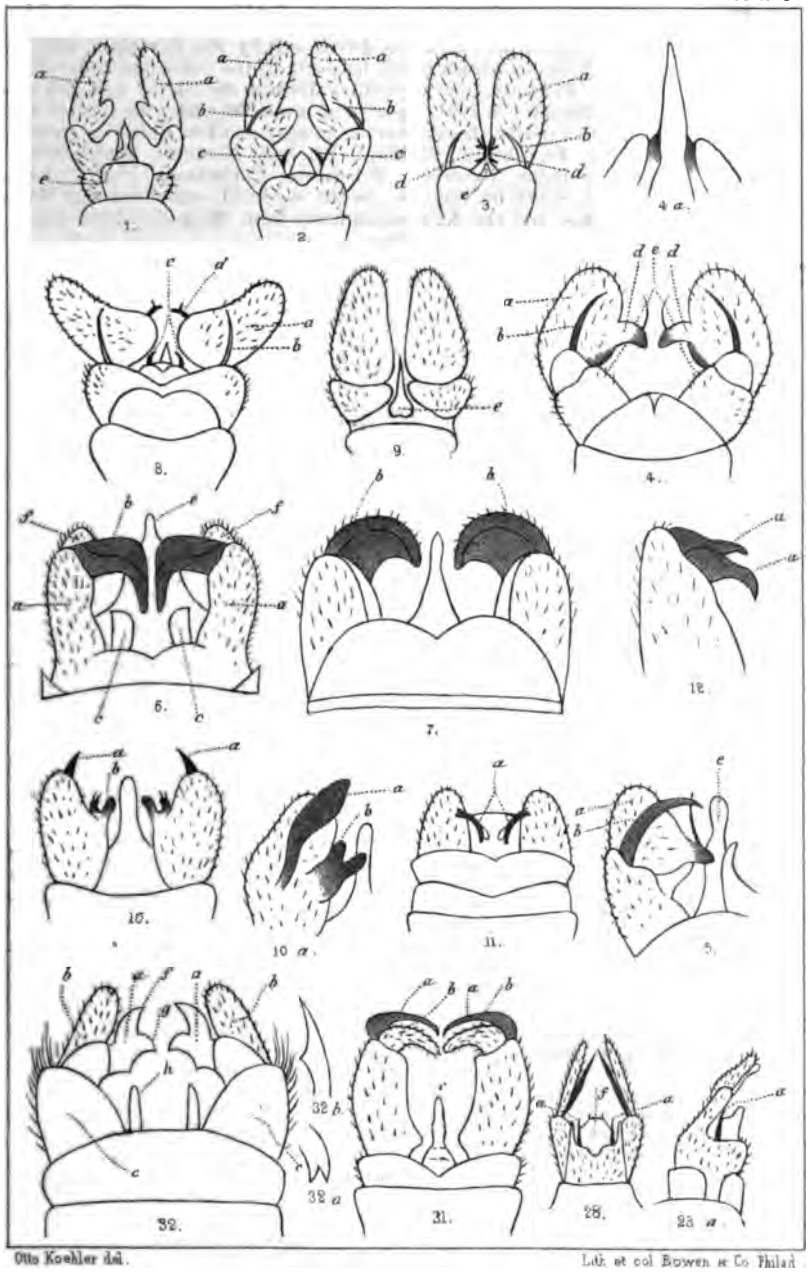
‖Decline and Fall of the Roman Empire. Chap. 28.

City fell into the hands of the Persian King Chosroes II. In 637 it was conquered by the Saracens, and again became a resort for pilgrims from various parts of the old world. Then it was under the sway of the house of Seljuk; the Turcomans under Ortok having hereditary command of the city and neighboring territory. At length Ortok was driven out by the Egyptians, who in their turn yielded the possession of the holy city to the Crusaders under Godfrey of Bouillon. From the time of Godfrey down to the fall of Acre and the cessation of the Crusades in 1291, a period of some 200 years, the City of the Great King and all Palestine became the sanguinary arena in which the natives of Great Britain, Frenchmen, Flemings, Belgians, Normans, Scandinavians cruisers from the Baltic, Bavarians, Bohemians, Carinthians, Piedmontese, Styrians, Genoese, South Italians, &c., on the one hand, contended with Mussulmen, Mamelukes and the Kharizmian horde from Mongolia on the other, for the possession of the Holy Sepulchre.

Two interesting questions here present themselves. Does this skull belong to any of the races of men, which in successive waves have swept over and occupied, for varying periods of time, the Holy City and surrounding country? Is it possible to indicate the race of which the peculiar form of skull before us is the cranial type? Following the method of exclusion, the only philosophical method available in researches of this kind, where the positive criteria or data for determining a diagnosis are wanting, I have already shown that we can safely affirm that the skull in question is neither Jewish, Arabian, Egyptian ancient or modern, nor Turkish. With equal safety we may say that it is not Roman in its origin or affiliation. For Blumenbach figures the skull of a Roman prætorian soldier (Tab. 32) given to him by the Cardinal Borgia. The configuration of this skulls differs from the Jerusalem fragment. "Protuberantia occipitalis externa latissima et ingenter eminens" are the words employed by Blumenbach in describing the hind head of the former. Both Sandifort* and Martin† speak of the broad forehead of the Roman skull, and Retzius,‡ in describing such a skull found in an ancient cemetry at York, also alludes to the "broad and well arched forehead, and the broad, rounded occiput and prominent occipital protuberance," features not found in the Jerusalem fragment. Finally Dr. Thurnam,§ in his description of the skull of Theodorianus, found in a Roman sarcophagus at York, (the ancient Eburacum,) tells us that "the forehead, though low, is remarkable for breadth; that the coronal surface presents an oval outline, and is notable for its great transverse diameter; and that the occipital bone is full and prominent, especially in its upper half. None of these characters are exhibited by the fragment before us.

Is this fragment a Persian head? In the Persian skull figured in Tab. 35 of Blumenbach's *Decades* the occiput is truncated or perpendicularly flattened. In this respect it resembles the Jerusalem fragment. But when we turn to the Persian heads in the Academy's collection we find that they present a rounded occiput. Here then a difficulty occurs at once, as to the normal occipital form of the Persian head. Is there one form which is constant and typical or not? From a general survey of the configuration of the occiput in the various races of men, I am constrained to answer this question in the negative. Only by means of a very large number of native Persian crania can we determine this point. The flatness of the occiput in Blumenbach's Persian skull may or may not be an accidental and unusual feature. Whether it is or not there are differences between the two skulls now under consideration sufficient to assign them to different races. In the Jerusalem skull the whole hind-head is so flattened that it extends but a short distance behind the

* Tab Cran. diversar. Nationum, p. 1.
† Man and Monkeys, p. 223.
‡ Kraniologisches in Müller's Archiv für Anat., Phys., &c. Jahr, 1849, p. 576.
§ Crania Britannica.


1.
2.
3.
4 a.
8.
9.
4.
6.
7.
12.
10.
10 a.
11.
5.
32.
32 b.
32 a.
31.
28.
28 a.

meatus. In the cranium figured by Blumenbach only the extreme portion of the occipital region is flattened, and there is much more of the head projecting back of the bony meatus. We may conclude, therefore, that the fragment does not belong to the Persic type.

Of the cranial characteristics of some of the races mentioned in the 2d chapter of the Acts of the Apostles, I have not been able to find any record whatever. The materials, therefore, for determining positively, by the method of exclusion, the race to which our Jerusalem fragment belongs do not exist. The various races of men occupying from the earliest times the ancient Ionia or Asia Minor and the table lands of Persia and Armenia, constituted a very heterogeneous population, in which Cushite, Shemitic, Arian and Turanian ethnic elements appear to be inextricably blended. Much uncertainty prevails among ethnographers as to the distinctive physical characters of these different races. The national types of the Medes and Parthians are not certainly known. These people are generally ranked among the Turanians, Scythians, or Turk-Tartars; while the Persians, by nearly all chronologists and philologists are looked upon as true Japetidæ. Mesopotamia appears to have been occupied from the remotest epoch by both Shemitic and Arian races. Renan, guided by philological data, considers the bulk of the population to be Shemitic.* To the Elamites Polybius and Strabo ascribe a northern origin. Josephus considers them to be the "ancestors of the Persians." Certainly in the first Maccabees, Persia and Persepolis are both called Elam. Lenormant, Quatremere, Movers and others consider the Elamites to be a people cognate if not identical with the Persians. On the other hand Löwenstern† thinks that the primitive Elamites were of Shemitic origin, and that in more recent times their ethnic characters were altered by intermixture with Scythic conquerors. It matters not which of these two theories we adopt. For as the Barclay skull differs from both Persian and Shemitic crania, it follows that in all probability it differs equally from the Elamitic skull.

The natives of Pontus were the Tibareni and affiliated tribes on the southeast of the Black Sea in the neighborhood of Colchis. The Tibarenians of Herodotus, according to Dubois,‡ are the Georgians of the present day. If so, the Jerusalem skull never belonged to a "native of Pontus."

If the Guanche skull in the collection represents truly the form of the Libyan or Berber head, the Jerusalem cranium cannot be considered as a specimen of that race;—for the skull of the Guanche is a long oval, terminated posteriorly by a protuberant occiput. In the Museum of the "Carolinischen Institut" at Stockholm, there are four Guanche skulls, which Prof. Retzius speaks of as "grosse, geräumige, ovale Schädel, sehr denen der Araber gleichend." In the anatomical Museum "de l'École de Médecine de Paris" there is a skull of a Kabyle woman. From the reference made to it by Dr. Gosse it appears to be a long, narrow skull.§ According to Furnari, however, the Berber cranium is "globuleux et conique en arriere."‖

According to Klaproth the Parthians were cognate with the Getæ, Massagetæ, and other tribes generally included by the ancient writers under the vague and comprehensive term Scythian.¶ Strabo calls them Carduchi, i. e. inhabitants of Curdistan. Pulszky says, "The Parthians were probably not Persians proper, but an unartistical Turanian tribe, held in subjection by the earlier Persians under their Achæmenian kings, which, in its turn, revolting

* Histoire Générale et Système Comparé des Langues Sémitiques. 1 ère Partie. Paris, 1855. Liv. I. Chap. II. § II.

† Revue Archeologique, 1850, pp. 677–723.

‡ Voyage autour du Caucase, Paris, 1840, 1V. 321, 328.

§ Essai sur les Deformations Artificielles du Crane. Paris, 1855, p. 59.

‖ Voyage médical dans l' Amérique Septentrionale. Paris, 1815, t. 1, p. 23.

¶ Tab. Hist. de l' Asie. p. 40.

from the yoke, ruled the Persians above four centuries."* Judging from the portraits of the 1st, 5th, 12th and 19th Arsaces, on their silver coins in the British Museum, the form of the Parthian skull must have been round or globular.†

Herodotus and Eudoxus, among the ancients, and Renan,‡ Gosche,§ Knobel‖ and others, among the moderns, consider the Phrygians to be closely affiliated to the Armenians. This opinion is based upon purely linguistic considerations. There are reasons, however, for thinking that these two people were not craniographically alike. Both Potocki and Dubois regarded the Phrygians as of Germanic origin. Hamilton Smith also speaks of them as a Getic clan. Among the five characteristic types of man exhibited in the bas-reliefs on the tomb of King Darius Hystaspes, excavated in the mountain Rachmend near Persepolis, there is a Lydian wearing a Phrygian cap, and "representing the mixed population of Asia Minor—a modification of the Arian type by the infusion of foreign blood —Iranian, Scythian and Shemitish interminglings."¶ The head is short and rounded. This is true also of a head of a Lycaonian warrior from a monument of Iconium, in the south-western part of ancient Phrygia. Renan, Movers and Knobel seem inclined to think that the ancient inhabitants of Pamphylia were of Phœnician origin. But the Phœnician, like the Shemitic skull, is dolicho-kephalic. Hence if the opinion of these gentlemen be well grounded, the short-headed Jerusalem fragment is not Pamphylian.

From these statements it will be seen that the Parthians, Phrygians, and perhaps also the Cappadocians and Cretans belong, in common with the Sclavonians, Finns, Turks, Kalmucks, &c., to the same short-headed group of crania to which must be assigned our Jerusalem skull. Of the exact form of their heads, however, I can obtain no satisfactory information. The affiliations of the Jerusalem skull must be sought in this direction. But the attempt to determine its exact place in the ethnographic scale is still further complicated by the question of deformation. Is it a deformed skull? It is not easy to answer this question positively. Deformed or distorted skulls are referrible, as regards the cause of distortion, to three classes, viz: 1st. Skulls artificially deformed by bandages, &c.; 2d. Skulls posthumously distorted in consequence of interstitial changes produced by the combined influence of pressure and moisture; and 3d. Skulls naturally or congenitally deformed in consequence of obliteration by synostosis of some one of the sutures, this obliteration taking place during intra-uterine or early extra-uterine life and by presenting a point of resistance, causing the brain and with it the calvarial bones to be unduly developed in certain directions, as has been very clearly shown by Dr. Humphry Minchin, of Dublin.** Now a careful inspection of the Jerusalem skull shows that no synostosis either of the lambdoidal or the posterior part of the sagittal suture can be pointed out. The occipital and parietal bones have been developed in the usual manner and from ossific points of ordinary number and location. The sutures mentioned though nearly consolidated have not been obliterated. The deformation is, therefore, not congenital. It is not posthumous, for if it were, the sutures would in all probability gap, and not admit of coaptation, and the head would be asymmetrical. We may conclude then that the head has been artificially deformed, by pressure strongly, evenly

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*Indigenous Races of the Earth, "Iconographic Researches on Human Races and their Art," p. 151.

†Ibid, pp. 170–171.

‡Op. Cit., p. 44.

§De Ariana linguæ gentisque armeniacæ indole. Berlin, 1847.

‖Die Vœlkertafel der Genesis, p. 98.

¶Iconographic Researches, p. 151.

**Contributions to Craniology. Dublin, 1856.

and continuously applied to the occipital region during growth. Formerly the custom of distorting the head was supposed to be confined to the American aborigines. It is now known to have prevailed in various parts of the old world as well as in the new. The Jerusalem skull is a strongly marked, perhaps I may say, an exaggerated example of the *Tête deprimée par dérrière*, of Dr. Gosse, of Geneva. This excellent craniographer divides all artificially deformed skulls into sixteen classes. In the fifteenth he places occipitally flattened crania. Besides the Peruvian and other aboriginal Americans, the Tahitians, according to Ellis,* and the natives of the Nicobar Isles, according to Nicolas Fontana,† were in the habit of flattening the heads of their children in this manner. Insfeld, cited by Sœmmering,‡ says of the Kalmucks, "quadratum formam appetunt." We learn from Vesalius that occipital deformation was practiced in his time by certain German tribes. "Germani," he writes, "vero compresso plerumque occipite et lato capite spectantur, quod pueri in cunis dorso semper incumbant, ac manibus fere citra fasciarum usum, cunarum lateribus utrinque alliguntur." Hence, the term *tête carrée* applied to the Germans. Vesalius also writes of the Turks: "Turcarum capite globi fere imaginem exprimunt, ad hanc quoque obstetricibus nonnunquam magna matrum sollicitudine opem ferentibus." The Tahitian and Nicobarian crania being dolichokephalic, we may, on this account, as well as for obvious geographical reasons, set them aside, as we have already the Turks, in our attempts to determine the nationality of the Jerusalem skull. We thus limit ourselves to a choice between the Mongols, Germans, Peruvians, and, for reasons presently to be stated, the Sclavonians, and a certain brachykephalic race, cranial specimens of which have been found in the Catacombs of Paris, by the late Dr. Harlan, and placed in the Academy's collection by his son. One of the latter, No. 664, bears much resemblance to the Barclay skull. The two, however, are by no means, identical in form. For the forehead in No. 664 is broader in proportion to the hind-head than in the Jerusalem skull; the crown in the former is consequently less triangular, and the occiput, though flattened in the same way, is not so decidedly and broadly flattened. The crown of our Jerusalem fragment more closely resembles that of a Sclavonian head from Olmutz, No. 1251 of the collection. The calvaria in both is triangular in shape, but more elevated at the junction of the sagittal and coronal sutures in the Sclavonian than in the skull from Palestine. The occipital region in the latter is globular, and has not been subjected to the flattening process. Nevertheless, if it had been vertically flattened by art, we can well imagine that it would have strikingly resembled the Jerusalem skull. The Sclavic skull from Morlack, in Dalmatia, exhibits an oblong coronal region. The shape of the crown in the short-headed German type (such as seen in Nos. 37 and 1063) is a rounded square. In the German head, No. 706, the crown is triangular, but that part at the junction of the sagittal and coronal sutures, is very much arched, and in this respect is unlike the Jerusalem fragment. In the long-headed Germans the crown forms a broad oval. The Jerusalem skull very closely resembles the cast of a Burat Mongol head, No. 1355 of the collection. It also resembles the Kalmuck skull, No. 1553, though less decidedly. In the brachykephalic Burat head there is the same triangular crown, narrow at the forehead and broad between the parietal bosses; the same moderate fulness of the centre of the dome, and the same symmetry. Had the occiput been flattened the forms of the two crania would have been identical. As it is, the occipital region projects but a short distance behind the foramen magnum, so that very little compression would be necessary to

* Polynesian Researches, London, 1831, vol. 1, p. 80.
† Asiatic Researches, London, 1799. vol. 3, p. 151.
‡ De Corp. Human. Fab. Traject ad Mœnum, 1794, 1, 62.

give to it the occipital form of the skull from Jerusalem. The absence of the truncated occiput in the only specimen of the Burat type in the collection need not deter us from referring the Barclay fragment to this type. I have already noticed the fact that the Kalmucks were in the habit of giving a square form to the head. This practice was confined to male children. Females were for the most part exempt from it, and consequently retained the form of head given to them by nature. It is curious to observe that the Burat cast has every appearance of being the cast of a female skull—of one, therefore, which has escaped compression. As if to confirm the reference here made of the Jerusalem skull to the Burat cranial type, I may say, that after the above lines had been written, I received a copy of Dr. Latham's "Descriptive Ethnology," published during the current year. In the first volume, when describing the Mongolian physiognomy, he alludes to my description of the only Kalmuck skull in the Academy's collection, and quoting Blumenbach's epithets, says that the cranial collection in the Berlin Museum, the largest he has seen, verifies these epithets. He says further, that "the base of some of the Burat crania, and the *truncation of the occiput, are in some cases inordinate.*" (p. 339.) I find additional confirmation of the ideas here advocated in a posteriorly flattened skull brought to the Academy, within a few days past, by Mr. J. H. Slack, who informs me that it belonged to the collection of Prof. Weinland, and was found upon the battle-field of Balaklava. Though labelled Cossack, it is undoubtedly of Mongolian origin. In many respects it is analogous to the Kalmuck skull No. 1553 of the collection, but unlike this latter it has the occiput flattened. The Cossacks, it will be remembered, are a mixed people, made up chiefly of Sclavonians, Turks and Mongols, the latter ethnic element predominating.

The Jerusalem skull resembles Nos. 85, 87, 450, 688, 752, 1232, 1458, 1459, 1464, 1473, 1481, 1493, 1495, 1504, 1509, 230, 497, and others of the Peruvian group. The former is, however, not identical in conformation with the latter. Nearly all these Peruvian skulls are irregularly distorted, and in most of them the sinciput appears to have been compressed as well as the occiput. Although distorted by the same means, and in general outline very much alike, yet they differ to some extent from each other in the shape of the crown, and even in the extent and direction of the occipital flatness. Except in the fact that the Burat and Kalmuck skulls are not artificially flattened as the Barclay cranium has evidently been, these three resemble each other more closely than the latter does the Peruvian. Nevertheless, the short-headed and occipitally flattened Peruvian skulls and our Jerusalem fragment are referrible to the same type, or at least to types so closely related that it requires careful examination to discriminate between them. Are we justified on this account in regarding the cranium from Jerusalem as a Peruvian skull? I think not. To refer a skull to its formal type is not the same as referring it to its appropriate race, nation or tribe. Two skulls of the same type may belong to very different races. This fact is involved in a curious law of homoiokephalic representation, which has been entirely overlooked by craniographers, and the neglect of which has in several instances, led to very curious mistakes. The ancient Avarian skull found at Grafenegg, in Austria, by Count Von Brauner, so closely resembled some of the elongated and cylindrically compressed Peruvian skulls, that Von Tschudi declared it to be of Peruvian origin, and supposed that it had been brought over from Peru to Austria with other collections. Prof. Retzius, with greater diagnostic skill, pointed out certain differential characters which were overlooked or regarded as of no importance by Von Tschudi, and pronounced the skull to be indigenous to Europe and to have belonged to the Avarians. This opinion, which at first gained no support, was afterwards proven to be correct by the discovery of similar skulls at Atzgersdorf, near Vienna, in Austria, at the village of St. Romain in Savoy, and in the valley of the Doubs, not far from Mandeuse. Fitzinger, Troyon,

Gosse and Duvernoy examined these crania and confirmed the opinion of Retzius. The first mentioned observer has shown that they resemble in every particular certain crania found in the Crimea and described by Rathke and Meyer.* To refer the Barclay fragment to the Peruvian race would be to repeat the mistake of Von Tschudi.

Thus, then, from the foregoing details we may conclude quite positively that the skull found by Mr. Barclay is neither that of a Jew, Arab, Egyptian, Fellah, Turk, Roman, Persian, Elamite, Tibarenian nor Libyan. Reasons have also been adduced opposing the ascription to it of a Peruvian origin.

It may have belonged to the Parthians, Phrygians, Mesopotamians, Cappadocians or Cretans, in so far as these are representatives of the so-called Turanian type. The craniographic data necessary to determine this point satisfactorily are almost entirely wanting.

It is, in all probability, either a Mongolian or a Sclavonian skull. In some respects it resembles both, in some respects it differs from both. Hence the difficulty of determining between the two,—a difficulty increased by the fact that these two cranial forms or types are themselves closely related, and possess features in common, and that the differential characters by which they are distinguished reside chiefly in the facial and basal bones, parts which are wanting in the Jerusalem fragment. The latter, however, as we have seen, resembles more closely the Burat cranial form than that of the Moravian variety of the Sclavic. It resembles the former more strikingly perhaps than any other head in the collection that has not been deformed. Still it may approximate just as closely the head of a Tschek, Wend, Slovack, Croat, Serbian, Pole or any other representative of the great Sarmatian stock. I cannot make the necessary comparisons to determine this point, for the Academy's collection contains no specimens of these transitionary races. I say transitionary, for through these Sclavonian tribes the brachykephalæ of Europe graduate into the brachykephalæ of Asia. To be more precise, I may say, indeed, that an attentive consideration of the Burat skull-type leads me to the belief that the short-headed races of Eastern Europe graduate into the Kalmucks and Mongols proper of Asia through the Sclaves and Burats of Lake Baikal. The latter people, judging from the cast in the Academy's collection, belong to a type somewhat higher in the human cranial scale than the Mongolian. According to Tchihatcheff, they manifest more aptitude for civilization than the pure Mongolian tribes.

The type of the Burat head being displayed in the fragment from Jerusalem, I refer the latter provisionally to the people and the region about Lake Baikal.

This opinion is announced not as a positive and indisputable conclusion, but as an approximation to the truth,—an approximation, moreover, whose scientific value is necessarily as incomplete as the facts upon which it is based are limited.

From the foregoing remarks it will be seen that neither occipital nor calvarial characters *per se*, are as valuable as is generally thought by craniographers in determining the race to which any particular skull belongs. In like manner basal, facial or lateral characters, taken singly, will not be sufficient to determine the type of a skull. This type is found neither in the base, nor in the dome, neither in the occiput nor the sinciput alone. To a great extent it resides in the sutures, and is determined partly by the number and location of the ossific centres, and the rapidity with which development proceeds from such foci, and partly by the extent and direction of this development. During

*See Proc. Acad. Nat. Sci. vii. 405; compare also Fitzinger's Essay "Ueber die Schädel der Avaren" Wien, 1853; and Retzius' "Blick auf den gegenwärtigen Standpunkt der Ethnologie," Berlin, 1857. pp. 42, 43.

the centuries that have elapsed, since man first appeared upon the surface of the earth, the ethnical peculiarities which appear to have originally characterised the laws of cranial development in the different races of men, have become so masked or modified by hybrid interminglings of varied degree and kind, that the great principle of the correlation of forms is scarcely available in inferring from one or more fragments of a skull the typical form of that skull. Cuvier, the discoverer of this important principle of palæontology, regarded every organized being as a whole, whose different parts correspond to each other in such a manner that none can change without the others changing also. Consequently, to him not only each part, but each fragment of a part, appeared to be the index of all the others. He asserted that not only the class, but the order, the genus, and even the species are expressed in the form of each part, in the smallest apophysis, the smallest bony facet. Guided by this teleological principle, the sagacious Cuvier, from the examination of a single tooth, was enabled to announce the character of the entire skeleton of an extinct reptile. The jaw bone and teeth of an extinct species of animal then unknown (Phascolotherium Bucklandii) he correctly ascribed to a marsupial quadruped allied to the opossum. In like manner the fragment of a fossil femur, found in New Zealand, was referred by Prof. Owen to an extinct genus of tridactyle Struthious birds. The correctness of this reference was afterwards attested by the discovery of numerous remains of several species of this genus. So also, Prof. Leidy, following the same great law of the harmonization of forms, was enabled to assign the fragment of a fossil molar tooth, from Missouri Territory, to a species of rhinoceros. Subsequently, he received from the same place fragments of the maxillæ and cranium of this species sufficient to confirm positively his opinion. Still more recently he referred a fragment of the anterior portion of a fossil upper jaw, from the valley of the Niobrara river, to a species of camel, and this reference was confirmed by the discovery of an entire jaw of the animal bearing the peculiar hook-like process, which differentiates it from all other ruminants.

But, though the palæontologist and comparative anatomist can, from minute fragments of bone, reconstruct many of the extraordinary species of animals that flourished in earlier geological epochs, yet the student of human craniography can seldom, with any certainty, indicate from a fragment the type and race of a skull. The palæontologist is assisted to his conclusions by the law of co-existing elements or harmony of forms, and when this fails, as it does at times, and as it occasionally did even in the hands of its illustrious discoverer, he can resort to the comparison of the fossil remains he may be studying with the similar parts of animals now existing. The craniographer cannot avail himself of this law of correlation. The existence of numerous transitionary forms, partly natural, partly hybrid, occupying places between the leading, typical stocks, and causing these latter to graduate into each other, in some instances almost insensibly; the difficulty of distinguishing between natural and hybrid sub-types; the existence of artificially deformed crania among different races in both hemispheres, some of them being purely arbitrary or conventional, and some of them imitations of natural but little known forms, all constitute serious obstacles to the practical application of this law to human crania. A still greater difficulty, moreover, is found in the fact that, in its practical working, this law is seen to be more generic than specific. In other words it differentiates genera better than species; species better than varieties. With the latter, though theoretically true, it is practically valueless. Cuvier himself was unable to point out specific osteological differences between the lion and tiger, the horse and ass, the dog and wolf, the leopard, panther, wild and domestic cats, &c. He was unable, consequently, to satisfy himself of the precise organic form or specific type to which the fossil representatives of these species belonged. Even, in regard to living species, Cuvier acknowledged that "La classe des poissons est de toutes, celle qui offre le plus de difficultés quand

on veut la subdiviser en ordres d'après des caractères fixes et sensibles."* Nevertheless, it is well known that Agassiz, abandoning the Cuvierian method of comparing animals by their organs, and adopting Bichat's scheme of comparing the tissues of organs instead, was enabled to reconstruct the fishes of the fossil world by noting carefully the characteristics of their tegumentary membrane.

If it be true, indeed, for the animal world at large, as maintained by Knox, that specific characters are in the main external; and that the anatomy of the interior leads to higher considerations than the mere determination of species; and if it be true, that, on this account, the law of correlation so often fails in its application to species, still more should it fail when used as a means of diagnosticating human crania from each other. For a serial unity of form is here more manifest than in the animal world proper, and this unity has become still more apparent under the combined influence of civilization and hybridity. In long periods of time civilization appears to be capable of modifying human cranial forms to a slight though appreciable extent. Hybridity, by introducing intermediate or transitionary forms, gives to osteological characters, originally differential, an uncertain or fluctuating value. Naturalists are not agreed whether the carnivora of the fossil world were identical with the lions, tigers, panthers, leopards, &c., of the present time, or were specifically distinct from these. They are not yet decided whether all the species of the present fauna of this continent are distinct from those found fossil in the post-pliocene deposits of South Carolina or not. They find that the teeth and bones of the living rabbit, racoon, opossum, deer, elk, hog, dog, sheep, ox and horse, cannot be distinguished anatomically from similar remains found in these deposits, and they are consequently at a loss whether to regard the former as the direct descendants of the latter, or entirely distinct from them; and this, too, notwithstanding that the fossil specimens are found associated with the remains of animals positively known to be extinct,—such as mastodon, megatherium, hipparion, &c.† They are not agreed whether the fossil horse resembled the quagga, the zebra, the dzigguetai, the domestic horse, or an animal wholly and specifically distinct from all these. Agassiz "entertains doubts respecting the unity of origin of the domesticated horse."‡ According to Knox, the fossil horse belongs to no species of this animal now living.§ Prof. Owen finding that one of the teeth of a certain fossil horse is somewhat more curved than the corresponding tooth of the recent horse, declares the former to be a distinct species, and names it Equus curvidens. Prof. Leidy is persuaded that many remains of an extinct species of horse, from the post-pliocene of this country, are undistinguishable from the recent one. The specimens of teeth of this animal, which he has had the opportunity of exhibiting, present so much difference in condition of preservation or change in structure; so much variation in size, from that of the more ordinary horse to the largest English dray horse; and so much variableness in constitution, from that of the recent horse to the most complex condition belonging to any extinct species described, that it would be about as easy, he thinks, to indicate a half dozen species as it would two.‖ So it is with the varied cranial forms displayed in the great natural family—man. Of human crania, it is just as easy, indeed, I think it is easier—to make twenty-seven races, types, permanent varieties, or species—call them what you will—as it is to make any less number—so very mobile, so very elastic is the fundamental plan or structural type of the human skull. The uncertainty which surrounds the definition of the species of the genus Equus, exists also in connection with the

*Règne Animale, i, ii p. 28.

†See Proceedings Acad Nat. Sci., July 1859, p. 184.

‡See his letter addressed to Prof. Holmes, in Proc. Acad. Nat. Sci., July 1859, p. 186.

§Introduction to Inquiries into the Philosophy of Zoology, in London Lancet, for October, 1855, p. 275.

‖Proc. Acad. Nat. Sci., July, 1859, p. 182.

genera bos, ovis, capra, ursus, canis, felis, sus, and other extant natural families, representative remains of which have been found in strata appertaining to geological epochs anterior to our own. Difference of species for Ursus maritimus and Ursus Americanus could not be predicated upon the skulls only of these animals. The crania of Felis canadensis, F. concolor, F. chalybeata, &c., in the Museum of the Academy, are identical in form and dentition with the skull of F. tigris. So, also, the skulls of Canis lupus, and C. familiaris are identical with each other. I doubt if there is the anatomist living who from the study of one or several bones of the head of one of the above mentioned species, could unerringly refer them to their proper species. Still less, if the animal were extinct, could they restore the species. To their appropriate genus these bones might be restored, and this genus might be reconstructed, but nothing more. So, also, supposing the Jew, the Gipsey, and the Eskimo, all long-headed people, were extinct, I feel very certain that no ethnologist could, from their crania alone, restore the distinctive, ethnic features of these people,—the prominent, unmistakable nose and mouth of the first, the long, dark and squinting eyes, and narrow radix nasi of the second, the stunted form and flat, lozenge-face of the last. On the other hand suppose the Finn, the Lapp, the Turk and the Sclav, all long-headed people, were among the past and gone. Then the problem would be, if anything, still more difficult. For these crania resemble each other much more closely than do those of the Eskimo, Gipsey and Jew. If we were to contrast the skull of an Eskimo with that of a Sclav or a Turk, or the skull of a Gipsey or Jew with that of a Finn or Lapp we should soon discover that there were greater differences between the crania thus compared, than between the different species of Ursus, or of Canis, or of Felis. The most striking difference is to be found in the length or antero-posterior dimensions of the two classes of skulls. Upon this feature, indeed, Retzius has founded his two groups of human crania—the dolichokephalic and brachykephalic. But this difference in length is accompanied by other characters, some of which though less striking to the ordinary observer, are not the less valuable and distinctive, in an ethnical point of view. If all skulls were either long or short the craniographer might readily refer any particular skull submitted to his inspection to one or other of these two classes. But there are many crania which are shorter than the so-called "long skulls," and yet longer than the so-called "short skulls." These constitute a class intermediate between the dolichokephalæ and brachykephalæ, into which they graduate on either hand so insensibly that they are inseparable from them by no trenchant lines. A skull having been placed among the dolichokephalæ, or it may be among the brachykephalæ, it is still as far from being minutely classified as the head of a dog which has been located in a group called simply "Canis." It may be orthognathic or prognathic, it may be square-, oblong-, oval-, or lozenge-faced; it may have an oval, triangular or square crown. In many skulls these features may be, and, indeed, are, variously combined. Individual crania of the same group not unfrequently exhibit these features differently combined. On the other hand two skulls closely resembling each other may belong to distinct races differing in general appearance, in language, in habits, in intellectual and instinctive traits. Contrast, for example, the skull of a Græco-Egyptian, No. 837 of the collection, with that of an ancient Swede, No. 1249. These heads differ no more from each other, than they respectively do from the other specimens of the groups to which they severally belong. Upon our side of the Atlantic the Swedish crania find their representatives in the Arickaree Indian skulls.

The Academy's collection furnishes other examples of this seeming paradox; some of them exhibited by races which occupy widely separated localities, and of the assumed community of origin of which there is not only no scientific proof of a positive character, but even no presumptive testimony that is reliable. The recognition of such facts led me, more than two years ago, to

express my conviction that strong resemblances between human cranial types do not infallibly indicate a common parentage,—such resemblances merely manifesting similarity of position in the human series.* Human osteology, however, is not peculiar in this respect. Prof. Agassiz thinks that the circumstances under which were found the fossil remains obtained by Prof. Holmes from the post-pliocene or post-tertiary beds of South Carolina, "show beyond the possibility of a controversy,"—I am using his own strong language,—"that animals which cannot be distinguished from one another, may originate independently in different fauna."† It will thus be seen that in many instances to refer a skull to its appropriate formal type is one thing; to refer it to its proper race, quite another. An obscure system of homolokephalic representation seems to prevail among the races of men, in virtue of which the cranial type of one race repeats itself among another people, very distant from, and unknown to the first. Hence the law of cranial correlations is, to a certain extent, obscured, and its utility in identifying and classifying human skulls very much impaired. But the great difficulty after all with the craniographer is to fix upon characters which are at once definitive, differential and constant, and therefore typical beyond all doubt or cavil. The skulls of the orthognathic Greek, and the prognathic Saharan Negro differ more from each other than do those of the nandu and ostrich, those of the llama and camel, or those of the genera Tarandus, Alces, Cervus, Panolia, Axis, Cariacus, Blastocerus, Capreolus and Cervulus into which naturalists divide the Cervidæ. But the negro differs cranially as much from the Eskimo, the Phœnician and the Malay as from the Greek. Yet the Eskimo, the Phœnician and the Malay, like the woolly-haired typical African, are all prognathic. The prognathism of the one, however, differs in kind from that of each of the others. Here, then, are differences which, though minute, serve to alter the entire physiognomical expression of a skull, and so affect not only its classification but its identity also. When we compare together extreme crania, without reference to intervening forms, these differences are seen to be differences of kind. But as soon as we take into comparison the transitionary cranial forms or types, which fill up the space or gap between these extremes, then these differences become differences of degree rather than of kind.

The same uncertainty characterises the species of many genera of birds, reptiles, shells, plants, &c. Dr. Adam Smith placed in a row all the known species of the natural family of the Alcaudæ, and in presence of such an ordeal, all the pretended specific external characters of naturalists completely broke down. Dr. Knox dissected the serpents of South Africa, and divided them, according to the dentition, into those with poison fangs, and those without. This he regarded as a scientific distinction. But when he began to dissect the serpents of the globe and not those of any particular region he quickly found that the distinction was invalid. That certain species of insects carry poisonous fangs only on the upper maxillary bones is true; but as there are many which carry also harmless teeth on the same bones, the fact becomes of little or no value scientifically or practically.‡ It is needless to multiply proof in this direction. Indeed it seems to be a general fact that just in proportion as the species of a genus become more and more numerous, their differential characters become more and more confused and uncertain, and the species when ranged side by side are seen to blend with or pass into each other in obedience to a great, fundamental law of gradation through which their true structural unity finds its only expression. Viewing the facts of specific differences in this comprehensive way, and bearing in mind that the question of

*Cranial Characteristics of the Races of Men, in Indigenous Races of the Earth, p. 349.

†See his letter to Prof. Holmes in Proc. Acad. Nat. Sci. loc. citat., p. 186.

‡Contributions to the Philosophy of Zoology, with special references to the Natural History of Man. London Lancet, November, 1855, p. 386.

Colymbetes densus, elongatus ovalis, postice paulo minus attenuatus, supra pallide flavus, capite nigro, antice flavo, macula verticali flavo, thorace rugis dædaleis minus subtilibus insculpto, macula media picea valde transversa, elytris strigis profundis nigris valde approximatis, subtus rufo-piceus, suturis, pedunque marginibus flavis. Long. ·64.

One male, Steilacoom, Mr. Gibbs. Similar in form to C. sculptilis, but less attenuated behind; with the transverse lines of the elytra yet deeper and more approximate: these lines are black, and therefore the elytra appear gray, but the pure pale yellow color appears at the side, suture and base: there is besides a black spot on each about one-fourth from the tip.

Necrophilus longulus, ellipticus, elongatus, nigro-piceus, nitidus, thorace latitudine vix sesqui breviore, æqualiter convexo, parce punctato, lateribus late rotundatus anguste marginatis, antrorsum paulo angustato, angulis posticis subrectis, fovea posticis utrinque prope angulum impressis, elytris striis crenatis, interstitiis 3io, 5to et 7mo punctis paucis impressis, antennis thorace haud longioribus, extrorsum incrassatis. Long. ·18.

One specimen, (female) from Table Mountain, below San Francisco, California, collected by Mr. George Davidson. Very different by its narrow form, and by the sides of the thorax not being depressed, from all the other species seen by me.

Catops pusio, ovalis, fuscus, helvo-pubescens, thorace latitudine plus sesqui breviore, lateribus rotundatis, angulis posticis subrectis, subtiliter dense strigoso, elytris postice rotundatis, transversim strigosis, stria suturali antice vix abbreviata; palpis antennarum basi apiceque flavis. Long. ·080

Punto de los Reyes, California; Mr. Davidson. The antennæ are a little longer than the thorax, and moderately clavate. The mesosternum is strongly carinate.

Anisotoma morula, ovalis, convexa, piceo-nigra, nitida, thorace antrorsum angustato, lateribus obliquis parum rotundatis, disco parce subtiliter punctulato, elytris subtilius seriatim punctatis, interstitiis subtiliter parce punctatis, alternis punctis paucis majoribus impressis. Long. ·11.

One specimen, Punto de los Reyes, California; Mr. Davidson. Of the size of A. indistincta *Lec.* but narrower, with the sides of the thorax less rounded, and having the striæ of the elytra composed of small close set punctures. The thorax is not quite twice as wide as its length at base, and diminishes gradually to the apex, where it is only a little wider than its length: the transverse impression near the base each side is as distinct as in the other species.

Lasconotus complex, linearis, sordide atra, opaca, capite concavo, thorace latitudine fere longiore, quadrato, lateribus paulo undulatis, parallelis, rude granulato, margine antico costisque utrinque duabus elevatis, interna apice et basi breviter dislocata, disco excavato, elytris margine, sutura, costisque utrinque 4 elevatis, interstitiis biseriatim cribratis. Long. ·15.

Punto de los Reyes, one specimen. A most interesting addition to our fauna. The genus was founded by Erichson upon a nondescript Mexican species; his description is quoted by Lacordaire, who had no opportunity of examining it in nature. It will be at once recognized by its concave head and three-jointed club of the antennæ.

Odontæus obesus, rotundato-ovatus, valde convexus, piceo-niger, nitidus, thorace basi rotundata, versus angulos vix sinuata, angulis posticis rectis, elytris striis fortiter crenatis, antennis piceis. Long. ·45.

Femina capite dense rugose punctato, tuberculo parvo frontali, plicaque verticali signato; thorace punctato, tuberculis duobus anticis plicaque transversa munito. Mas latet.

Table Mountain, below San Francisco; Mr. Davidson. Very much larger

than any of the other species of the genus. The male is one of the finest entomological prizes which will reward the collector in Western America. Differs from our other two species by the color, and by the base of the thorax being less sinuate, whereby the posterior angles become more rectangular.

Lachnosterna errans, fusco-ferruginea, oblongo-ovata, convexa, capite fortiter haud confluenter punctato, clypeo fortiter marginato, fere integro, thorace antice angustato sat dense punctato, lateribus angulatis, longe ciliatis, elytris haud costatis fortius punctatis, pygidio parce subtiliter punctato, pectore longe villoso, unguiculis dente mediocri armatis. Long. ·70.

One male, Contra Costa, California; Mr. J. Child. Resembles closely in form and sculpture L. cephalica *Lec.*, Journ. Acad. Nat. Sci. Phila., 2d series, 3, 245, but the sides of the thorax are fringed with long hairs, angulated at the middle and then narrowed with a concave outline to the apex; the clypeus is scarcely emarginate. The antennæ are 10-jointed, the club is as long as the basal portion; the penultimate ventral segment has a transverse crest concave posteriorly, and finally the fixed spur of the posterior tibiæ is very short, the moveable one about twice as long, curved, flattened and subobtuse.

Dichelonycha pallens, breviuscula, testacea, parce pubescens, clypeo reflexo, angulis rotundatis, thorace latitudine duplo breviore, apice fere truncato, antice angustato, lateribus valde rotundatis, medio subangulatis, angulis posticis valde obtusis, confluenter dense punctato, elytris punctatis subcostatis; antennarum clava nigro-picea. Long. ·30.

One specimen, Punto de los Reyes. Resembles D. testacea *Kirby*, but is much smaller, comparatively wider, the clypeus less rounded at apex, the thorax more rounded on the sides, with the posterior angles more obtuse.

Adelocera rorulenta, rufo-picea, punctata, nigro-squamosa, squamisque aureis parce conspersa, thorace latitudine paulo longiore, late profunde canaliculato, ante medium magis angustato, lateribus rotundatis, angulis posticis planis haud divergentibus, elytris depressis vix obsolete striatis, tarsorum anticorum sulcis parum distinctis. Long. ·59.

Shasta Co., Dr. Suckley, one specimen. Resembles A. aurorata, and in the absence of a specimen for comparison, was incorrectly referred by me to that species (P. R. R. Expl., xi. 18,); it is, however, less elongated, with the posterior angles of the thorax not divergent, and the tarsal grooves on the under surface of the prothorax are much less apparent.

Dascyllus Davidsonii, fusco-piceus, dense pubescens, confertissime punctulatus; thorace latitudine plus duplo breviore, antrorsum angustato, lateribus rotundatis, basi late bisinuato, elytris striis approximatis, punctatis antice obliteratis, antennis valde serratis, articulo 3io sequenti æquali. Long. ·48—·52.

Punto de los Reyes, Mr. Davidson, to whom I take great pleasure in dedicating this fine species. It differs from those previously described by the strongly serrate antennæ; these organs are half the length of the body in the female, and a little longer in the male; the second joint is small, the third, fourth and fifth are triangular, and nearly as wide as long; the following ones gradually diminish in breadth; the eleventh is oval elongate and constricted at the end. The last segment of the abdomen is marked towards the base with a semicircular impression, with the concavity behind, as though it were formed by the union of two segments.

Charopus moerens, nigro-virescens, alutaceus opacus, tenuissime pubescens; thorace latitudine sublongiore, ovato, postice subangustato, margine postico medium anguste testaceo, postice transversim vage impresso, elytris (feminæ) elongatis postice sensim latioribus, apice rotundatis, abdomine paulo brevioribus. Long. ·13.

One specimen, Punto de los Reyes, Mr. Davidson. The first example of the occurrence of the genus upon this continent. The head is slightly wider than the thorax: the latter is feebly sinuate on the sides behind, the elytra are more distinctly green, they are twice as long as the head and thorax united, and nearly cover the abdomen, which is subacute at tip. The antennæ are half as long as the body, with the second joint a little shorter than the third.

Anobium gibbicolle, fuscum, pube subtilissima sericans, valde elongatum, thorace latitudine fere sesqui longiore, antice angustatum, lateribus sinuatis, apice basique rotundato, medio utrinque ad latera oblique profunde impresso, disco postice medio valde elevato, ad angulos posticos profunde impresso, angulis rotundatis marginatis, elytris, thorace latioribus striis punctatis interstitiis paulo convexis. Long. .22.

One specimen, Punto de los Reyes: Mr. Davidson. Belongs to the division having 11-jointed antennæ: the joints 4–8 are very small; the 3d is a little longer; the 2d is longer and thicker, though not as large as the basal joint: the 9th, 10th and 11th are equal, narrow, and each one is as long as the joint 3–8 together. The body is still narrower than in A. foveatum *Kirby*, and the posterior angles of the thorax are rounded: the sides near the anterior angles are emarginate, so that the latter become distinct, though deflexed: the eyes are small and convex, and the head is transversely impressed just behind them.

Anobium punctulatum, rufo-testaceum, cylindrico-ovale, pubescens, capite confertim punctato, thorace brevi æqualiter convexo, lateribus rotundatis late marginatis, confertim punctato, elytris thorace haud latioribus, sat dense punctulatis; antennis articulis 3 ultimis singulatim præcedentibus duobus æqualibus. Long. .13–.18.

Two specimens, Punto de los Reyes. Very similar to A. convexifrons *Melsh.*, but differs by the punctures of the elytra being less close. The antennæ as in it are 11-jointed: the joints 2, 4, 6 and 8 are a little shorter than the others, the 9th, 10th and 11th are each equal to the 7th and 8th together.

Helops opacus, apterus, ater opacus, capite thoraceque densissime punctatis, hoc latitudine sesqui breviore, modice convexo, lateribus tenue marginatis rotundatis, postice subangustato, basi truncato, angulis posticis subrectis, elytris connatis oblongo-ovatis, convexis, thorace paulo latioribus, postice valde declivibus, punctis oblongis striatis, interstitiis haud convexis, rugosis et confertim punctatis. Long. .53.

One specimen, Sacramento, California, given me by Mr. Ratkvon. The three joints of the anterior and middle tarsi are densely hairy beneath, but scarcely dilated.

Hypulus fulminans, elongatus piceus, parce pubescens, sat dense profunde punctatus, thorace latitudine haud breviore, lateribus rotundatis, angulis posticis subobtusis, basi utrinque late et profunde fovesto, elytris fasciis tribus valde angulatis, una obliqua, altera cum secunda connexa, maculaque magna ante apicali pallidis, antennis fuscis basi testaceis, femoribus tibiisque medio fuscis. Long. .31.

Oregon. Mr. Davidson. This species so resembles in its characters Diaclina Holmbergii *Mann.*, Bull. Mosc., 1852, 347, that I cannot help suspecting that they are identical. A renewed examination of Mannerheim's *type* would be necessary, however, before such a suggestion could be admitted.

Notoxus sparsus, elongatus, testaceus nitidus, pallide pubescens, capite thoraceque rufo-tinctis, hoc globoso, cornu elongato apice fortiter marginato et concavo, crista subito elevata supra marginata et paulo concava, elytris thorace paulo latioribus, parcius subtiliter punctatis, gutta utrinque antemo-

tellari, altera ante medium versus latera, fasciaque lata communi postica ad sutnram angulata nigris. Long. 13.

Punto de los Reyes, two specimens: Mr. Davidson. Narrower than N. *cylicornis*, with the elytra only sparsely punctulate. The lateral spot of the elytra is absent in one specimen. The margin of the horn has only two or three indistinct serratures.

Salpingus alternatus, æneo-niger nitidus, capite thoraceque sat dense punctatis, hoc ovato, latitudine paulo longiore, postice angustiore, vage inæquali, elytris striis fortius punctatis, haud impressis, interstitiis 3, 5 et 7 punctis paucis notatis; rostro capite breviore, fronte concava, antennis picis basi testaceis. Long. 13.

Punto de los Reyes, one specimen. Of the same form and size as S. *vitescens Lec.*, but with the striæ of punctures of the elytra more plainly marked, and without the interstitial rows of equally large punctures, which are so obvious in that species.

Cossonus scrobiculatus, niger nitidus, elongatus, rostro punctato, ad apicem subito parum dilatato, capite fere lævi, thorace latitudine longiore, antrorsum angustato, lateribus late rotundatis, rude punctato, dorso postice paulo deplanato, medio subcarinato, elytris convexis, cylindricis, thorace paulo latioribus, striis crebrosis, interstitiis striis haud latioribus. Long. 20.

Punto de los Reyes, Mr. Davidson. The rostrum has an oblong impression at the middle, and the front is marked with a small fovea.

Hylesinus pubulosus, elongatus, piceo-niger opacus, setulis brevissimis adspersus, capite confertim punctato, transversim biimpresso, thorace latitudine paulo breviore, antrorsum sensim angustato, lateribus antice sinuatis, apice late subtubulato, squamulis nigris obtecto, elytris thorace parum latioribus, striis tenuibus punctatis, squamulis nigris cinereisque tessolatis. Long. 13.

Table Mountain, California, one specimen, Mr. Davidson. Very distinct from any other that I have seen.

Callidium infuscatum, elongatum, fusco-piceum parce pubescens, capite dense punctulato, thorace latitudine paulo breviore, lateribus rotundatis, dense punctato, linea dorsali lævi, elytris sat dense minus subtiliter punctatis, abdomine pedibusque testaceis. Long. 43.

Punto de los Reyes. Similar to C. *æreum Newman*, but differs by the head being finely punctured, the thorax more densely punctured, and by the abdomen being testaceous.

Ptilinus conspersus, nigro-piceus, pube brevi griseo-sordida densa variegatus, thorace latitudine haud breviore, lateribus subrotundatis vix obsolete tuberculatis, postice sinuatis, rude parce varioloso, calio utrinque discoideo interque postico parvis, elytris thorace latioribus, granulis elevatis, punctisque minus densis, postice sensim subtilioribus, fasciis duabus vagis obliquis minus pubescentibus. Long. 73—77.

Oregon Mr. Davidson and Dr. Kennerly. Similar to P. *granulatus Lec.*, Proc. Acad. 1859, 90, but differs by the lateral tubercles of the thorax being obsolete. The antennæ of the male are as long as the body, those of the female one-fourth shorter.

Chrysomela stigmoidea, nigro-ænea, oblongo-rotundata, thorace sat dense, elytris fortius punctatis, elytris thorace parum latioribus albo-testaceis, sat dense punctatis, suturæ, vittæ confluente antice breviter discretæ, vittis duabus curvatis, interiore antice, exteriore postice abbreviatis, guttisque externis paucis nigro-æneis. Long. 32.

Oregon; a specimen kindly given me by Mr. Henry Ulke. More nearly allied by its markings to C. *dislocata Rogers* than to any other of our species, but differing by the much wider thorax, and more dense punctures

both of thorax and elytra, as well as by the markings of the latter. The inner curved stripe extends from one-sixth from the base to one-third from the apex; the outer one is contiguous to it, connected with a humeral spot, and abbreviated behind at the middle.

Haltica æruginosa, oblongo-ovalis, modice convexa, obscure cuprea, subnitida, thorace convexo, subtilissime punctulato, linea transversa postica obsoleta, antrorsum subangustato, lateribus parum rotundatis, elytris thorace latioribus, dense punctulatis. Long. ·16.

San Francisco, one specimen.

Haltica evicta, oblongo-ovalis, minus convexa, cuprea, nitida, thorace punctulato, linea transversa postica subtili distincta, versus angulos posticos foveato, antrorsum subangustato, lateribus parum rotundatis, elytris thorace latioribus, subtiliter punctatis striis nonnullis obsoletissimis, sulcoque versus latera parum distincto. Long. ·20.

Sacramento, one specimen; Mr. Rathvon.

Haltica tincta, oblongo-ovalis, modice convexa, nigro-ænea nitida, thorace convexo, parce obsolete punctulato, linea transversa postica tenui, antrorsum angustato, lateribus paulo rotundatis, elytris thorace latioribus, sat dense punctatis. Long. ·20—·22.

Table Mountain, below San Francisco, Mr. Davidson: two specimens. These three species belong to the division Graptodera *Chevr.*

Dibolia ovata, ovata, convexa, nigro-ænea, nitida, subtiliter punctulata, elytris seriebus punctorum subtilibus postice haud distinctis, antennis nigris basi testaceis, tibiis tarsisque anterioribus testaceis, femoribus obscuris. Long. ·12.

One specimen, Punto de los Reyes. The posterior thighs are black, and the tibiæ and tarsi dark brown. Broader and more ovate than D. ærea *Mels.*, with the rows of punctures of the elytra very fine, not impressed, and obliterated behind.

Luperus smaragdinus, elongatus, cyaneo-viridis, antennis nigris basi fuscis, thorace convexo, quadrato, lateribus paulo rotundatis, anticis prominulis rotundatis, parce subtiliter punctulato, elytris sat dense punctulatis. Long. ·23.

Punto de los Reyes, three specimens, Mr. Davidson. Resembles L. varipes *Lec.* but differs by the entirely black legs, and by the thorax being much less densely punctulate. The second and third joints of the antennæ together are equal to the fourth; the third is one half longer than the second.

Coccinella melanopleura, ovalis, modice convexa, capite thoraceque haud dense punctulatis, illo maculis duabus albis, hoc limbo antico, lateribus late (macula nigra inclusa) lineola apicali, maculisque duabus basalibus albis, scutello nigro, elytris ferrugineis, confertim subtiliter punctatis; subtus nigra, tibiis tarsisque fusco-testaceis. Long. ·21.

Table Mountain, Mr. Davidson, one specimen. Closely resembles the varieties of C. picta, with immaculate elytra, but differs by the body being entirely black beneath, and by the elytra being more finely punctured. It is probable that varieties will occur with white thorax having black spots, and also with elytral markings.

Coccinella barda, hemisphærica, capite punctulato, albo, postice nigro, thorace parce punctulato, nigro, macula magna utrinque, limboque antico albis, elytris subtiliter dense punctatis, ferrugineis, fascia transversa communi pone basin nigris, scutello, suturaque ad basin nigris; subtus nigra, epimeris albis. Long. ·21.

Punto de los Reyes, one specimen, Mr. Davidson. There is no trace of any posterior spots on the elytra: the band stops on the humerus, and is slightly widened there.

List of Species.

CARABIDÆ.

LEBIA Latr.

cupripennis *Boh.*, Eugenies Resa, 7, ... 'Cal.
angulata *Boh.*, ibid. . . . . 'Cal.
an potius Rhombodera?

DROMIUS Bon.

quadricollis *Lec.*, Pr. Acad. Nat. Sci. 1859, 82, ... Or.

CYMINDIS Latr.

abstrusa *Lec.*, Pr. Acad. Nat. Nat. Sci. 1859, 82, ... Or.

PLATYNUS Bon. (emend. Brulle.)

bembidioides *Lec.*, ... Or.
Sericoda bembidioides Kirby.

ANISODACTYLUS Dej.

semipunctatus *Lec.*, Pr. Acad. Nat. Sci. 1859, 83, . . . Or. Cal.

AGONODERUS Dej.

rugicollis *Lec.*, Pr. Acad. Nat. Sci. 1859, 83, ... Cal.

BADISTER Clairv.

anthracinus *Lec.*, Pr. Acad. Nat. Sci. 1859, 83, . . . Or.

CHLÆNIUS Bon.

simillimus *Chaud.*, Bull. Mosc. 1856, 2, 283, ... 'Cal.
Chlœnius vicinus‡ Mann.

BEMBIDIUM Illiger.

erasum *Lec.*, Pr. Acad. Nat. Sci. 1859, 83, ... Or.
obliquulum *Lec.*, ibid., ... Cal.
aptum Lec., Pr. Acad. Nat. Sci. 1859, 281.

NEBRIA Latr.

livida *Lec.*, Pr. Acad. Nat. Sci., 1859, 84, ... Or.

DYTISCIDÆ.

COLYMBETES Clairv.

densus *Lec.*, Pr. Acad. Nat. Sci. 1859, 282, ... Or.

SILPHALES.

SILPHA Linn.

trituberculata *Lec.*, ... R.
Oiceoptoma trituberculatum Kirby.
Silpha sagax Mann.

NECROPHILUS Latr.

tenuicornis *Lec.*, Pr. Acad. Nat. Sci. 1859, 84, ... Or.
longulus *Lec.*, ibid., 282, ... Cal.

CATOPS Payk.

pusio *Lec.*, Pr. Acad. Nat. Sci. 1859, 282, ... Cal.

ANISOTOMA Fabr.

morula *Lec.*, Pr. Acad. Nat. Sci. 1859, 282, ... Cal.

STAPHYLINIDÆ.

PHILONTHUS Leach.

varicolor *Boh.*, Eug. Resa, 29, ... 'Cal.

SUNIUS Leach.

trinotatus *Boh.*, Eug. Resa, 32, ... 'Cal.

PÆDERUS Fabr.

cæruleipennis *Boh.*, Eug. Resa, 33, ... 'Cal.

STENUS Latr.

chalybæus *Boh.*, Eug. Resa, 33, ... 'Cal.

PHALACRIDÆ.

OLIBRUS Er.

aquatilis *Lec.*, Pr. Acad. Nat. Sci. 8, 17, ... Cal.
piceus Boh., Eug. Resa, 38.

HISTERIDÆ.

HISTER Linn.

sellatus *Lec.*, Pac. R. R. Rep. 47°, xi, 35, ... Cal.
Senevillii Mars., Ann. Ent. Fr. 3d ser. 5, 422,, tab. 10, f. 119'.

NITIDULIDÆ.

RHIZOPHAGUS Herbest.

puncticollis *Boh.*, Eug. Resa, 39, ... 'Cal.

TROGOSITIDÆ.

PELTIS Kug.

serrata *Lec.*, Pr. Acad. Nat. Sci. 1859, 84, ... Or.

COLYDII.

AULONIUM Er.

æquicolle *Lec.*, Pr. Acad. Nat. Sci. 1859, 84, ... Cal.

LASCONOTUS Er.

complex *Lec.*, Pr. Acad. Nat. Sci. 1859, 282, ... Cal.

CUCUJIDÆ.

PSEUDOPHANUS Lec.

signatus *Lec.*, Pr. Acad. Nat. Sci. 1859, 85, ... Or.

SCARABÆIDÆ.

CERUCHUS M'Leay.

striatus *Lec.*, Pr. Acad. Nat. Sci. 1859, 85, ... Or.

PHOBETUS Lec.

comatus *Lec.*, Journ. Acad. Nat. Sci. 2d, 3, 225, ... Cal.
Tryssus? comatus Lec., Pac. R. R. 47°, xi, 38,

POLYPHYLLA Harris.

crinita *Lec.*, Journ. Acad. Nat. Sci. 2d, 3, 230, ... Or. Cal.

LACHNOSTERNA Hope.

errans *Lec.*, Pr. Acad. Nat. Sci. 1859, 283, ... Cal.

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DICHELONYCHA Kirby.

pallens *Lec.*, Pr. Acad. Nat. Sci. 1859, 283, ... Cal.

SERICA M. L.

serotina *Lec.*, Journ. Acad. Nat. Sci. 2d, 3, 275, ... Cal.
frontalis *Lec.*, ibid. 276, ... Or.
robusta *Lec.*, ibid. 276, ... Cal.

HOPLIA Illiger.

oregona *Lec.*, Journ. Acad. Nat. Sci. 2d, 3, 205, ... Or.
irrorata Lec., Rep. Pac. R. R. Exp., 40.
convexula *Lec.*, Journ. Acad. Nat. Sci. 2d, 3, 285, ... Cal.
pubicollis *Lec.*, ibid. 285, ... Cal.
callipyge *Lec.*, ibid. 285, ... Cal.

APHODIUS Illiger.

militaris *Lec.*, Pr. Acad. Nat. Sci. 1858, 65, ... Cal.

ODONTÆUS Klug.

obesus *Lec.*, Pr. Acad. Nat. Sci. 1859, 282, ... Cal.

THROSCIDÆ.

LISSOMUS.

plagiatus *Boh.*, Eugen. Resa, 66, ... 'Cal.

ELATERIDÆ.

PHLEGON Lap.

herculeanus‡ (Lac. Gen. Col. 4, 123,) . . . . . 'Cal.

CORYMBETES Latr. (emend. Lec.)

tinctus *Lec.*, Pr. Acad. Nat. Sci. 1859, 85, ... Or.
protractus *Lec.*, ibid. 85, ... Or.

AGRIOTES *Esch.*

opaculus *Lec.*, Pr. Acad. Nat. Sci. 1859, 85, ... Or.

ELATER Linn.

tartareus *Lec.*, Proc. Acad. Nat. Sci. 1859, 85, ... Or.
cordifer *Lec.*, ibid. 72, ... Cal.
Lecontei Candère, Mow. Elat. 2, 459, (May, 1859.)
ignobilis *Boh.*, Eugen. Resa, 68, ... 'Cal.
variegatus *Boh.*, ibid. 69, ... 'Cal.

ADELOCERA Latr.

rorulenta *Lec.*, Pr. Acad. Nat. Sci. 1859, 283, ... Or.
turorata‡ Lec., Pac. R. R. Expl. 18.
cavicollis *Lec.*, Pr. Acad. Nat. Sci. 1859, 86, ... Cal.

CARDIOPHORUS Esch.

fenestratus *Lec.*, Pr. Acad. Nat. Sci. 1859, 86, ... Or.

ATOPIDÆ.

DASCYLLUS Latr.

Davidsonii *Lec.*, Pr. Acad. Nat. Sci. 1859, 283, ... Cal.

LAMPYRIDÆ.

PTEROTUS Lec.*

obscuripennis *Lec.*, Pr. Acad. Nat. Sci. 1859, 86, ... Cal.

1859.]

*I now recognise this genus as related to Phengodes.

TELEPHORIDÆ.

TELEPHORUS Geoffr.

peregrinus *Boh.*, Eugen. Resa, 80, ... 'Cal.

MELYRIDÆ.

CHAROPUS Er.

mœrens *Lec.*, Pr. Acad. Nat. Sci. 1859, 283, ... Cal.

PTINIORES.

XYLETINUS Latr.

puberulus *Boh.*, Eugen. Resa, 88. . . . . 'Cal.

ANOBIUM Fabr.

marginicolle *Lec.*, Pr. Acad. Nat. Sc. 1859, 87, ... Or.
gibbicolle *Lec.*, ibid. 284, ... Cal.
quadrulum *Lec.*, ibid. 87, ... Or.
punctulatum *Lec.*, ibid. 284, ... Cal.
cornutum *Lec.*, ibid. 87. . . . . Cal.
pudicum *Boh.*, Eugen. Resa, 86, ... 'Cal.

DORCATOMA Herbst.

affine *Boh.*, Eugen. Resa, 87, ... 'Cal.

TENEBRIONIDÆ.

ELEODES Esch.

grandicollis *Mann.*, ... Cal.
valida Boh., Eugen. Resa, 90.
scabricula *Lec.*, Pr. Acad. Nat. Sci. 1859, 187, ... Cal.
constricta *Lec.*, ibid. 187, ... Cal.
subaspera *Solier*, St. Ent. 246, ... 'Cal.
impressicollis *Boh.*, Eug. Resa, 90, ... 'Cal.
This is either E. planata or E. scabrosa.

SCOTOBÆNUS Lec.

parallelus *Lec.*, Pr. Acad. Nat. Sci. 1859, 88, ... Cal.

HELOPS Fabr.

opacus *Lec.*, Pr. Acad. Nat. Sci. 1859, 284, ... Cal.

XYSTROPUS Sol.

opacus *Lec.*, Pr. Acad. Nat. Sci. 1859, 78, ... Cal.

PYTHIDÆ.

RHINOSIMUS Latr.

pallipes. . . . . 'Cal.
Rhinomacer pallipes Boh. (err. typ.) Eugen. Resa, 112.

SALPINGUS Gyll.

alternatus *Lec.*, Pr. Acad. Nat. Sci. 1859, 285, ... Cal.

MELANDRYADÆ.

PHRYGANOPHILUS Sahlb.

collaris *Lec.*, Pr. Acad. Nat. Sci. 1859, 88, ... Or.

HYPULUS Payk.

fulminans *Lec.*, Pr. Acad. Nat. Sci. 1859, 284, ... Or.
? *Dircæa Holmbergii* Mann.

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MORDELLONES.

ANASPIS Latr.

nigriceps *Lec.*, Pr. Acad. Nat. Sci. 1859, 88, ... Or.

ANTHICIDÆ.

NOTOXUS Geoffr.

sparsus *Lec.*, Pr. Acad. Nat. Sci. 1859, 284, ... Cal.

ANTHICUS Fabr.

cæsiosignatus *Boh.*, Eugen. Resa, 104, ... 'Cal. (Puna.)
troglodytes *Boh.*, ibid. 105, ... 'Cal. (Tahiti.)
nitidus *Boh.*, ibid. 105, ... 'Cal.
atomarius *Boh.*, ibid. 106, ... 'Cal.
amplicollis *Boh.*, ibid. 106, ... 'Cal.

CURCULIONIDÆ.

BRUCHUS Linn.

ramicornis *Boh.*, Eugen. Resa, 112, ... 'Cal.

COSSONUS Clairv.

scrobiculatus *Lec.*, Pr. Acad. Nat. Sci. 1859, 285, ... Cal.

HYLESINUS Fabr.

nebulosus *Lec.*, Pr. Acad. Nat. Sci. 1859, 285, ... Cal.

CERAMBYCIDÆ.

CALLIDIUM Fabr.

infuscatum *Lec.*, Pr. Acad. Nat. Sci. 1859, 285, ... Cal.

ERGATES.

spiculatus *Lec.*, ... Or. Cal.
Macrotoma californica White, B. Mus. Cat. Long. 37 (♂).
Macrotoma spiculigera White, ibid. 39 (♀).

ELAPHIDION Serv.

procerum *Lec.*, Pr. Acad. Nat. Sci. 1859, 88, ... Or

BROTHYLUS Lec.

conspersus *Lec.*, Pr. Acad. Nat. Sci. 1859, 285, ... Or.

LEPTURA Linn.

xanthogaster *Lec.*, Pr. Acad. Nat. Sci. 1859, 88, ... Or.
quadrillum *Lec.*, ibid. 88, ... Or.
lætifica *Lec.*, ibid. 89, ... Or.
sanguinea *Lec.*, ibid. 89, ... Or
dehiscens *Lec.*, ibid. 89, ... Or.
lugens *Lec.*, ibid. 89, ... Or.

DORCADION Dalman.

Lorquinii *Fairemaire*, Ann. Ent. Fr. 3d, 3, 322, ... 'Cal.

CHRYSOMELINÆ.

SYNETA Esch.

suturalis *Lec.*, Pr. Acad. Nat. Sci. 1859, 89, ... Or.
seriata *Lec.*, ibid. 90, ... Cal.

GLYPTOSCELIS Lec.

albidus *Lec.*, Pr. Acad. Nat. Sci. 1859, 81, ... Cal.

CHRYSOMELA Linn.

elegans *Oliv.*, ... Or.
sigmoidea *Lec.*, Pr. Acad. Nat. Sci. 1859, 236, ... Or.

HALTICA Illiger.

æruginosa *Lec.*, Pr. Acad. Nat. Sci. 1859, 285, ... Cal.
evicta *Lec.*, ibid. 286, ... Cal.
tincta *Lec.*, ibid. 286, ... Cal.

DIBOLIA Latr.

ovata *Lec.*, Pr. Acad. Nat. Sci. 1859, 286, ... Cal.

LUPERUS Geoffr.

smaragdinus *Lec.*, Pr. Acad. Nat. Sci. 1859, 286, ... Cal.

GALLERUCA Geoffr.

angularis *Lec.*, Pr. Acad. Nat. Sci. 1859, 90, ... Cal.

ANOPLITIS Kirby.

quadrata *Lec.*, ... Cal.
Hispa quadrata Fabr.

COCCINELLIDÆ.

COCINELLA.

lacustris *Lec.*, Pr. Acad. Nat. Sci. 6, 131, ... Or.
melanopleura *Lec.*, Pr. Acad. Nat. Sci. 1859, 286, ... Cal.
barda *Lec.*, ibid. 286, ... Cal.

CHILOCHORUS Leach.

pleuralis *Lec.*, Pr. Acad. Nat. Sci. 1859, 90, ... Cal.

Nov. 1*st.*

Vice-President BRIDGES in the Chair.

Thirty-one members present.

The following were presented for publication in the Proceedings:

Notes and descriptions of foreign Reptiles, by E. D. Cope.

Description of two new species of Carboniferous Fossils, by Wm. M. Gabb; and were referred to Committees.

The number of the Proceedings of the Academy for October was laid on the table by the Committee.

The recent death in London of Dr. Thomas Horsfield, late a Correspondent of the Academy, was announced.

Nov. 8*th.*

Vice-President LE CONTE in the Chair.

Thirty-seven members present.

The following were presented for publication in the Proceedings:

Descriptions of new species of Birds from Cape St. Lucas, lower California, by Mr. John Xantus.

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Notes on a Collection of Birds made by Mr. John Xantus, at Cape St. Lucas, lower California, by Spencer F. Baird.

Mineralogical Notes, No. II., by William Johnson Taylor.

Description of new species of the Coleopterous family Hesteridæ, by John Le Conte; and were referred to Committees.

Nov. 15th.

Mr. LEA, President, in the Chair.

Twenty-seven members present.

A paper entitled Contributions to American Lepidopterology, No. II., by Brackenridge Clemens, M. D., was presented for publication in the Proceedings, and was referred to a Committee.

Nov. 22d.

Vice-President BRIDGES in the Chair.

Thirty-two members present.

A letter was read from Mr. Eugene Borda, dated Woodside, Schuylkill Co., Penn'a., Nov. 21st, giving information regarding two specimens of Lepidodendron presented this evening.

"One of the impressions is marked on both sides and is evidently the plant; the other fits exactly on one of the sides of the other. I have seen many Lepidodendrons, but never any such specimen; it is also the opinion of all those who have seen them, and I hope they will be a valuable addition to the collection of the Academy.

The locality is top slate of Back Vein on the south side of Mine Hill, at our Black Heath Colliery, the outlet of which is a tunnel at Wolf Creek, near Minersville. The Back vein is under the Black Heath Vein, some 20 yards west of the Mine Hill Gap. It keeps all the time distant from the Black Heath Vein, but east of the Gap; the two veins form but one, called the Mammoth Vein, and extensively worked at Clair."

A letter was read from George Davidson, Esq., dated San Francisco, Cal., Oct. 15th, giving information concerning a valuable and extensive series of specimens from the Geysers of the Pluton Cañon, presented this evening.

By Express this steamer I shall try to send to the Academy two boxes containing specimens of waters and products of the "Geysers," about 72 miles N. N. W. of this city. I made a visit there for two or three days, and went hurriedly over the whole ground, yet noting but a tithe of the wonders. The collection may enable some of you to judge of this great natural curiosity. By the same express I shall have forwarded a barrel containing the head, skin, and back bone of a very large bass (?) caught in the bay a couple of days ago, and which I obtained, supposing that, if nothing new, it would at least make up in size for the want of novelty. Notes of his size, appearance, contents of stomach, &c., were made by Dr. Ayres, but I have not yet obtained them. However, the following newspaper item will give you an idea of the specimen. When weighed his tail and head were just touching the ground, yet the scale in-

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dicated 360 lbs. "Dimensions: His weight was 360 pounds; length from tip of nose to end of tail seven feet and one inch; breadth round the shoulders, thickest part, five feet two inches; length from tip of nose to end of jaw, covering the gills, two feet four inches; circumference of mouth, when braced open, three feet two inches; spread of tail from tip to tip, two feet three inches."

Dr. R. E. Rogers remarked upon the great interest excited by these specimens, and on motion a Committee was appointed to investigate their nature, and to procure from Mr. Davidson further information regarding their occurrence.

The thanks of the Academy were then ordered to be tendered to Mr. Davidson for his valuable donation received this evening.

Nov. 29th.

Mr. LEA, President, in the Chair.

Thirty-eight members present.

The Proceedings of the Biological Department for the present month were read.

The following papers, on report of the respective Committees, were ordered to be printed in the Proceedings.

Notes and Descriptions of Foreign Reptiles.

BY E. D. COPE.

TESTUDINATA.

The following species of Tortoises were brought by Mr. P. B. Duchaillu from equatorial West Africa, the present Autumn.

Kinixys erosa *Gray*. This curious species appears to be abundant throughout Gaboon, and the country of the Camma and Ogobai. Its range northward extends as far as the Gambia.

Sternothærus Derbianus *Gray*. Length, including head and neck, 14 in. 8 lin.; length of plastron, 6 in. 6 lin.; greatest breadth of do., 5 in.; breadth of head just before the tympani, 2 in. 5 lin.

Inhabits swamps in the Camma country.

This is probably the above named species, but judging from figures and descriptions, it approaches closely the S. sinuatus *Smith*, of South Africa, differing mainly in the form of the upper mandible, which is obtusely hooked in the former, bidentate in the latter. The habits of the two appear to differ; the S. African species inhabiting deep rivers, and remaining long at a time beneath the surface. It is considered by Dr. Gray (Catalogue Brit. Mus.) as identical with the S. castaneus *Bell*, but there is a manifest discrepancy between Smith's description, and the brief one of castaneus in the "Catalogue,"—principally with regard to the form of the vertebral scuta. The resemblance to the S. Derbianus is much closer, but judging as before, it is our impression that it is distinct from both.

HEPTATHYRA nob.

Cartilaginous border obsolete at the sides of the disc, and destitute of ossicles posteriorly. Sternum with two cartilaginous flaps, which cover the posterior extremities when retracted. Sternal callosities seven; one on each side corresponding to the closely connected hyo- and hyposternals, one to each of the

epi- and xiphisternals, and one to the discoid entosternal. Hyo- and hyposternals united to the disc by suture, and separated from the episternals by a large cartilaginous interval. Head acute, parietal region depressed, frontal slightly arched. Nostrils not subdivided by a transverse process of the septum. Lips greatly developed, forming biangular flaps on each side of the mouth.

Heptathyra Aubryi. *Cryptopus Aubryi* Dumeril. Revue et Magasin de Zoologie; 1856, page 364.

Total length 2 feet, 6 in.; of sternum 15 in. 6 lin.; of head and neck 11 inches. Numerous specimens from the Fernando Vas river, Equatorial W. Africa.

The Dogania subplana of India doubtless exhibits the extreme of the Trionychoid modification of the Chelonian type, in the tardiness of the only partial union of the ribs into a carapacial disc, and the imperfect development of the sternal bones. There are but two callosities. Aspidonectes exhibits a superior grade of organization. The union of the ribs is more complete, a comparatively small part of their extremities extending beyond the disc in adult age. The sternal bones are better developed, especially the hyo-hypo- and xiphisternals. There are four external callosities.

Those species which agree in possessing cartilaginous flaps upon the posterior lobe of the sternum, are included by M. Dumeril in the single genus Cryptopus; but in some respects they are strikingly dissimilar. T. punctatus and T. Senegalensis are very interesting, as possessing in the free marginal ossicles the analogues of the marginal bones so universal among higher Chelonians. This far from unimportant peculiarity is wanting in the T. frenatus and Petersii; while the additional character of every sternal bone being protected by a corresponding external callosity (their number thus amounting to nine), proves the propriety of the generic name Cycloderma assigned by M. Peters. T. Aubryi, it is seen, agrees with the last in the absence of ossicles, but maintains the more typical Trionychoid peculiarity of one undivided callosity covering the hyo- and hyposternal bones. The extent of the union of these, (hæmapophyses,) with the disc, (pleurapaphyses,) without lateral cartilaginous or osseous "appendage," offers as good an example of a normal "hæmal arch" as is to be found in the order.

The object of generic nomenclature being, as we understand it, to indicate the modifications of Nature's types and the sensible steps by which they approach each other, to ignore any such step appears to us unphilosophical. Hence we venture to propose for the species under consideration the generic appellation of Heptathyra.

Aspidonectes aspilus *nob.*—Head acute, plane, not sloping as in Platypeltis. Lips thin, not developed into flaps. Septum of the nasal orifice with a short process on each side. Ribs eight pairs, projecting in the adult about two inches beyond the disc. Disc subcircular, broadly truncate behind, vermiculately rugose. Vermiculations transverse along the sutures of the costal plates, longitudinal between. Vertebral line slightly depressed. Cartilaginous border extending two inches beyond the edge of the anterior sternal callosity, and 9 in. 10 lin. from the posterior margin of the disc, to within 3 in. 6 lin. of the end of the tail. Sternal callosities four. The posterior subtriangular, anterior and posterior angles divergent, the inner almost in contact. Anterior angle with an emargination corresponding to an angular process in the posterior border of the hyposternal. The interior and exterior borders of the anterior callosity made nearly right angles with its anterior edge. This is not perfectly transverse, so that the inner borders approach to within 1 in. 11 lin. of each other, they then round off and extend much farther posteriorly than the external borders. Episternal bones small, considerably separated, diverging anteriorly. Claws nearly straight, compressed, sharp at their inner edges, dirty white. Disc brown, vermiculations shaded with yellow. Border, extremities, neck and head dark brown, without spots or markings of any kind. Sternal callosities whitish.

Length of disc 17 in.; of head and neck 19 in. 6 lin.; total, four feet. Length of sternum 20 in. 6 lin.

Habitat.—The Rembo and Ovenga rivers, tributaries of the Fernando Vas, Equatorial West Africa.

Not having at hand specimens of the Aspidonectes niloticus of W. and S. Africa, we have been unable to compare the only specimen of the aspilus with it; their differences are, however, sufficiently obvious. In the latter the sternal callosities are much smaller, and the anterior pair have their anterior and posterior borders nearly parallel, and the outline of the inner semicircular. The tail is shorter, and the colors are brownish green with white and yellow spots.

The Old World Aspidonectes possess eight pairs of ribs; we do not know how it is with the American species, as there are no authentic specimens in the Acad. mus., but our Amyda and Glatypeltis have but 7 pairs.

EMYDOSAURIA.

Crocodilus marginatus *Geoffr.*—Brought by Mr. Duchaillu, from the Ogobai. This species is principally abundant in the Cape colony, but is found in other parts of Africa.

OPHIDIA.

COLUBRIDÆ—CALAMARINÆ.

OLISTHENES nob.

Head scarcely distinct from the body, depressed, especially in front. Muzzle elliptical in outline, projecting much beyond the under jaw, as does also the superior labial region. At the posterior extremity of the superior maxillary bone are two curved teeth, larger than the other maxillaries, separated from them by an edentulous space, and grooved in front. Cephalic shields normal. Vertical broad; loral small. Rostral prominent, broad, dividing the anterior frontals somewhat; not recurved. Preocular 1, postoculars 2. Urosteges and anal shield entire. Scales very smooth.

O. euphaeus *nob.*—Scales subequally hexagonal on the flanks, more elongate on the back, very little imbricate; in nineteen rows. The rows diminish in number upon the tail, by two or more running together upon the dorsal region, thus forming short series of from four to six scales twice or thrice the usual width. Vertical plate broad, hexagonal, the anterior angle very obtuse, the posterior acute, dividing the occipitals. Superciliaries rather small, broader behind in consequence of the convergence of the sides of the vertical. Posterior frontals large, extending on the side of the head half way along the preocular. Anterior frontals rather small. Nostril between two nasals; the anterior large, separating the rostral and first labial, and nearly reaching the edge of the mouth. Rostral broad, triangular, depressed, slightly dividing the anterior frontals. Postoculars two. Superior labials eight, the first three small, the eye resting on the fourth and fifth. Pupil erect, elliptical. Inferior labials eight, the fourth largest, and in contact with the posterior geneials, of which there are two pairs.

Gastrosteges 205, anal 1, urosteges 75.

Color uniform brown, dark on the head and anterior part of the body, lighter posteriorly, and pale beneath.

Length 2 ft. 9 in. 6 lin. Tail 17 in. 6 lin.

Had Dr. Günther placed his Hologerrhum philippinum among the Calamarinæ, instead of Scytalian Colubridæ, we should have felt well satisfied in recording this as a second species of that genus; we are not positive, indeed, that it may not yet be so considered; but with our present knowledge we must distinguish it generically. The head of this serpent is very Calamarian in its indistinctness from the body, its depression and projecting rostral. Besides these, a broader vertical and more distinctly divided rostrals distinguish it from Hologerrhum.

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Rhinosimus (*D.* and *B.*) placed by Günther among the Calamarinæ, differs only in the keeled, recurved rostral, and Rhinostoma *Fitz.*, the only other genus with grooved maxillaries, has the recurved rostral, with divided urosteges.

The form and glossy smoothness of the Olisthenes euphaeus admirably adapt it for making its way among pieces of bark, decayed logs, and other debris of the forest. Its native country is unknown to us, but as it was obtained in a jar containing a specimen of the species below mentioned, it probably came from South America.

CORONELLINÆ.

Liophis vittatus. *Coluber vittatus* Hallowell, Proceed. Acad. Nat. Sci., Vol. ii. p. 242. The serpent described as above, from specimens brought by Mr. Ashmead from Venezuela, is a true Liophis, resembling the L. reginæ, tæniurus, and conirostris, but without the transverse markings of the first and second, and the peculiar plating of the last. There are numerous specimens in the Acad. Mus. It does not appear to be known to European herpetologists.

Descriptions of two new species of Carboniferous Fossils, brought from Fort Belknap, Texas, by Dr. Moore.

BY W. M. GABB.

Myalina deltoidea.—Shell triangular, flattened, beaks narrow, tapering and curved anteriorly; cardinal margin slightly curved and nearly as long as the anterior edge; anterior edge gently sinuous; posterior edge nearly straight; basal edge rounded; umbones subangular; umbonal ridge running parallel with the anterior border losing itself near the basal edge; anterior umbonal slope perpendicular to the plane of the valve; posterior umbonal slope gentle, and extends to the posterior edge; inside, the cardinal third of the shell shows an alation which is invisible exteriorly; surface marked with indistinct concentric lamellæ.

This shell was found near Fort Belknap, either in the coal or in the stratum of dark blue shale overlying the coal. The specimens, consisting of a left valve, nearly perfect, and several fragments of the beaks showing the hinge well preserved, are replaced by pyrites.

Posidonia Moorei.—Shell subquadrangular, slightly gibbous, cardinal edge straight; beaks small, near the anterior edge, and slightly projecting beyond the cardinal line; umbones prominent, anterior edge rounded; posterior edge straight above, rounded below to meet the basal margin, which is regularly curved; surface marked by about twenty prominent round concentric ribs.

Locality and Position. From a buff colored limestone above the coal, near Fort Belknap.

Descriptions of supposed new species of Birds from Cape St. Lucas, Lower California.

BY JOHN XANTUS.

A sojourn of several months at Cape St. Lucas, Lower California, besides furnishing many species of birds not found by me at Fort Tejon,* has brought to light several species, which, as far as I have now the means of judging, seem to be entirely new. I subjoin descriptions of those which appear to be most decidedly undescribed birds, although it is very probable that a careful

* See Proceedings Acad. Nat. Sciences, August, 1859, for a list of birds collected by me at Fort Tejon, California.

examination of others of the collection made will result in the detection of additional ones.

I defer for the present any notice of the habits and peculiarities of these and other birds of the Cape, preferring to make this the subject of a special memoir, after a longer residence shall have enabled me to collect all the facts bearing on this subject.

PICUS LUCASANUS, Xantus.

General appearance that of *Picus nuttalli* and *scalaris*. Bill stout: as long as or longer than the head. Above black, banded transversely with white on the back and scapulars to the nape, the rump and outer tail feathers entirely black. quills with a row of white spots on each web: the outer square, the inner rounded, these spots on the tertials becoming transversely quadrangular. Beneath brownish white, with rounded black spots on the sides of the breast, passing behind on the flanks and under tail coverts into transverse bars. Greater inner wing coverts transversely barred. Outer two tail feathers white, with one, sometimes two terminal bars, next to which are one or two bars on the inner web only; third feather black, the outer web mostly white, with traces of a terminal black bar: sometimes there is a greater predominance of black on the inner web. Two white stripes on side of head, one starting above, the other below the eye with a tendency to meet behind and form a whitish collar on the nape. Male with the entire top of the head streaked with red, becoming more conspicuous behind; each red streak with a white spot at base. Feathers covering the nostrils smoky brown.

Length 7·15, extent 12·15, wing 4·00, bill above 1·00, middle toe and claw ·80.

CAMPYLORHYNCHUS AFFINIS, Xantus.

Very similar to C. *brunneicapillus*. Above grayish olive, each feather on the back streaked with white, bordered externally by black. Upper tail coverts and upper surface of tail grayish, with indistinct transverse black bars, much broken; quills with a marginal row of rounded whitish spots on each web. Beneath white, sometimes very faintly tinged behind with yellowish brown; the whole under surface quite uniformly marked with rounded spots (more elongated anteriorly) and of much the same size. On the breast these spots are rather angular and generally do not cross both webs; posteriorly, however, they are more central, and several are sometimes strung along the shaft of the feather. These spots are larger and rounder on the under tail coverts. Tail feathers, excepting the two central black, each web banded from the base with alternating bars of white, six or more in each series. Top of the head uniform cinnamon brown, perhaps slightly paler towards the edges of the feathers; a white line from the nostrils over the eye to the nape, the white, however, streaked with black. Bill and legs dark brown, base of under mandible paler.

Length 7·50, extent 9·75, wing 4·35, tail 4·40, bill above ·90, tarsus 1·10.

HARPORHYNCHUS CINEREUS, Xantus.

Very similar to *Mimus montanus*, with longer and more curved bill. The upper parts are grayish brown or cinereous with a faint trace of rufous on the rump. Beneath white with a tinge of brownish yellowish towards the vent; the breast and sides with sharply defined sagittate or subtriangular spots of brown, scarcely elongated on the sides, the shade of brown similar to, but darker than that of the back. The lateral tail feathers are tipped with white, the outer one sometimes edged with the same. There are two narrow dull whitish bands on the wings.

Length about 10 inches, wing 4·00, tail 4·75, bill above (in a straight line) 1·00.

This species is very abundant at the Cape, and its nests are found among the cactuses in large numbers. The eggs resemble those of the mocking birds much more than those of the rest of the genus.

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BRACHYRHAMPHUS HYPOLEUCUS, Xantus.

Bill slender and slightly curved, about half the length of head. Tarsus scarcely shorter than middle toe. Above dark brownish black, the edges of the feathers with a plumbeous tinge; the side of neck below, and the axillars with the concealed portion of the sides of the breast, ashy plumbeous. Entire under parts, including tail coverts and inside of the wings, pure white, this color extending on the sides of the head so as to include the eyes, the lids, however, are tinged with dusky; bill black; legs apparently reddish in life.

Length 10 inches, extent 15·80, wing 4·70, tail 1·80, bill above ·70, gape 1·20, tarsus ·85, middle toe 1·00.

This specimen is considerably weatherbeaten, and the old feathers of the upper parts are much worn, and bleached at the edges. The new ones are however as described.

Notes on a collection of Birds made by Mr. John Xantus, at Cape St. Lucas, Lower California, and now in the Museum of the Smithsonian Institution.

BY S. F. BAIRD.

Mr. Xantus, in transmitting to the Smithsonian Institution a collection of objects of Natural History made at Cape St. Lucas, Lower California, in the months of April, May, and June, 1859, has added descriptions of the species which he ascertained to be new by reference to the limited number of works at his command. These all appear to be really nondescript, and a careful comparison of the entire collection with supposed analogues from the north, shows differences in other species, entitling them to specific rank.

The examination of the collections of Mr. Xantus has proved of very great interest in elucidating the zoological peculiarities of the Cape, and especially in showing that its fauna is almost identical with that of the Gila River, and to a certain extent with that of the Rio Grande. It is an important fact also, that while these relationships are exceedingly intimate, there is almost none to the coast fauna of Upper California. As the birds were all collected during the spring months, after the migrating species had passed northward, they may be considered as especially characterizing the region. An examination of the list will show that of the forty-two kinds thus far received from Mr. Xantus, seven, or one-sixth, are peculiar to the Cape and probably new, while but two of the land birds which characterize the Pacific region of upper California are found there, all the other species being either distributed generally over the whole United States, or belonging especially to the Gila or Rio Grande regions, separately or collectively, and to that of the Southern Rocky Mountains.

Similar conclusions are to be derived from an examination of the other land vertebrates. The most characteristic mammal is the *Spermophilus harrisii*, heretofore only found in the Colorado desert. The *Perognathus penecillatus*, another Colorado species, is also met with. The *Macrotus californicus*, a leaf-nosed bat, heretofore only known from a single specimen taken at Fort Yuma, is very abundant. *Lepus californicus* and *trowbridgii*, *Mephitis bicolor* and *Vespertilio pallidus*, Le Conte, appear to be species common to the Cape and to Western Upper California, the two latter occurring also in Texas.

In the Reptilia, also, very interesting facts are to be observed. Here, as far as can be ascertained by a hasty examination, out of about twelve species of Saurians, and as many Ophidians, not one is found in Upper California, the species consisting (with the exception of a few new ones) of such as *Dipsosaurus dorsalis*, *Uta ornata* and *stansburiana*, *Sceloporus scalaris*, *Callisaurus*, *Stenodactylus variegatus*, &c. There is a *Phrynosoma* very similar to the "*cor-tum*" of Upper California, but quite distinct. There is also a very

Ctenosaura. The serpents are *Ophibolus splendidus*, a new *Crotalus*, *Masticophis testaceus*? a Rio Grande *Nerodia*, *Arizona elegans*, *Scotophis Emoryii*, *Lamprosoma episcopum*, etc., or species very closely allied to them.

The Zoology of the east side of the gulf of California is not sufficiently well known to allow a satisfactory comparison with that of Cape St. Lucas; it is however probable that the Gila fauna does not extend as far down as the latitude of the Cape, being displaced by the northward extension of the fauna of Western Mexico. Even at Guaymas, species of birds and reptiles occur, of genera different from those of the United States, as for instance the genus *Dryophis* among the serpents.

It may safely be considered as very probable, that additional species of the Gila and Colorado regions will hereafter be detected at the Cape, and that a closer examination of the former localities will bring to light several of the species for the first time noticed in the Cape collection of Mr. Xantus.

What the causes are which have produced this peculiar distribution of animal life on the Cape, it is at present impossible fully to elucidate. The mountain crests which extend longitudinally along the peninsula might form an impassible barrier to the passage of species from one coast to the other, but as there appears to be no greater obstacle to the extension southward to Cape St. Lucas from the coast region of Upper California, than from the mouth of the Colorado along the east side of the peninsula, we would expect to find a much greater mixture of species at the Cape than really exists. No information is at present at our command as to the zoology of the interior of the peninsula. It is, however, quite probable that the narrow vallies enclosed between the mountainous sides of the peninsula may have species widely different from either those of the Cape itself, and of Upper California, and more analogous to those of Mazatlan and its vicinity.

The region in which Mr. Xantus obtained the birds hereafter enumerated, is one which at first sight would not seem a very promising field for exploration. The shore is sandy for about a quarter of a mile inland, whence a cactus desert extends for a width of about six miles up to the high mountains on the West and North. The *Cereus giganteus* is a prominent feature in this peculiar vegetation, rising occasionally to a height of sixty or more feet. The ground is covered for miles with a saline efflorescence, painful to the eye, into or through which the feet sink to a considerable distance. There is no fresh water nearer than San José, a distance of twenty-eight miles. The region, though in the spring and summer inhabited almost exclusively by land birds, is said in the rest of the year to be the resort of innumerable water fowl and waders, among which Mr. Xantus will doubtless find many rare species.

Before proceeding to an enumeration of the summer birds of Cape St. Lucas, it may be well to state that they illustrate in a remarkable degree the law derived from an examination of large series of specimens in the Smithsonian museum, and frequently referred to in the ninth volume of the Pacific R. R. Report; namely, that whenever species have a wide range in latitude as resident birds or as summer visitors, the farther North the species is found breeding, the larger it is, and vice versa. The same principle applies, though in less marked degree, to an increasing altitude in the same latitude. The difference in size between the same species of bird breeding at Cape St. Lucas and in the Colorado Valley, or in the more northern Rocky Mountains, is very striking, so much so as readily to induce the impression of a difference in the species.

The following table will illustrate more fully what has been said in regard to the geographical distribution and character of the species. It will be seen that all the characteristic land species of the Cape (all supposed to be new excepting *Colaptes chrysoides*) are exceedingly abundant, breeding in large numbers.

LIST OF SPECIES.	Cape St. Lucas.	Coast region of Upper California.	Fort Yuma and Lower Gila.	Southern R. Mts., and El Paso.	Valley of Rio Grande toward its mouth.	South Atlantic and Gulf States.	Northern Atlantic States.	South America.	REMARKS.
1. Tinnunculus sparverius, *Vieill.*	*	*	*	*	*	*	*	*	
2. Bubo virginianus, *Bonap.*	*	*	*	*	*	*	*		
3. Picus lucasanus, *Xantus.*	*								Very abundant.
4. Centurus uropygialis, *Baird*	*		*						" "
5. Colaptes chrysoides, *Malh.*	*		*						" "
6. Geococcyx californianus, *Baird.*	*	*	*	*	*				Abundant.
7. Chordeiles texensis, *Lawr.*	*		*	*	*				"
8. Myiarchus mexicanus, var. *Baird*	*[1]	*[?]	*[?]	*[?]	*[?]				"
9. Sayornis nigricans, *Bonap.*	*	*	*	*	*				One specimen.
10. Empidonax obscurus, *Baird*	*		*	*	[2]				" "
11. Hirundo thalassina, *Sw.*	*	*	*	*	[2]				Rather common.
12. Progne purpurea, *Boie*	*	*[4]	*	*	*	*	*		" "
13. Phalnopepla nitens, *Sclater*	*		*	[2]					Common.
14. Mimus polyglottus, *Boie*	*				*	*			Not common.
15. Harporhynchus cinereus, *Xantus*	*								Very abundant.
16. Campylorhynchus affinis, *Xantus*	*								" "
17. Polioptila melanura, *Lawr.*	*		*	*	*				One specimen.
18. Paroides flaviceps, *Baird*	*		*	*	*				Very common.
19. Carpodacus frontalis, *Gray*	*	*[?]	*	*					Common.
20. Chondestes grammaca, *Bonap.*	*	*	*	*	*				One specimen.
21. Zonotrichia leucophrys, *Swain*	*			*	*	*	*		Two specimens.
22. Calamospiza bicolor, *Bonap.*	*			*	*				" "
23. Guiraca melanocephala, *Swain*	*		*	*					One specimen.
24. Cyanospiza versicolor, *Baird*	*	*	*	*	*				Three specimens.
25. Pyrrhuloxia sinuata, *Bonap.*	*		*	*	*				Common.
26. Cardinalis igneus, *Baird.*	*								Very abundant.
27. Pipilo albigula, *Baird*	*								" "
28. Agelaius ———	*								One specimen.
29. Icterus parisorum, *Bonap.*	*			[2,5]					Very common.
30. " cucullatus, *Swain.*	*								Three specimens.
31. Cyanocitta californica, *Strickl.*	*				*				Not common.
32. Melopelia leucoptera, *Bonap.*	*	*			*				Very abundant.
33. Chamæpelia var. pallescens, *Baird.*	*								" "
34. Lophortyx californica, *Bonap.*	*								Common.
35. Garzetta thula, *Bonap.*	*	*							One specimen.
36. Ægialitis vociferus, *Cassin*	*	*	*	*	*	**	*	**	
37. Calidris arenaria, *Illiger*	*					**	*	**	
38. Fulica americana, *Gmel.*	*		*	*	*	**	*	**	
39. Graculus dilophus, *Gray*	*						*		
40. Thalassidroma melania, *Bonap.*	*								One specimen.
41. Blasipus heermanni, *Bonap.*	*								
42. Brachyrhampus hypoleucus, *Xan.*	*								One specimen.
	42	18	21	20	18	8	8	4	

An examination of the table will show that seven (all new) out of forty-two species may as yet be considered as peculiar to Cape St. Lucas. Two land birds and two water birds belong to the coast region of Western North America; two species are peculiar to the Lower Gila and Colorado, (*Centurus uropygialis* and *Colaptes chrysoides,*) although both may be found in time as far east as El Paso. On the other hand, fourteen of the species occur in the region extending from the Gila to the lower Rio Grande, none of them found in Upper California, although several stretch northward in the Rocky Mountain

[1] If this large-billed bird be considered as distinct (*M. pertinax*) from the true *M. mexicanus*, it will be entered only in the Cape column.
[2] Found in the extension of the mountains south-east into Mexico
[3] Extending northward as far as Fort Bridger.
[4] Confined to the southern end of this region; at Fort Tejon.
[5] Found on the Pecos only in this region.

region considerably beyond the latitude of San Francisco. But a single species (*Garzetta thula,*) belongs to the South American fauna; and this may not be the same bird as the Chilian.

One of the most striking facts of all is that not a single land animal has been identified as found in Mexico and not in the United States also. Not a single bird of the Western Tierra Caliente of Mexico has been yet met with, however abundant it may be on the opposite side of the gulf, not much over a hundred miles across.

The case, however, is quite different with the marine invertebrates, which, as might be expected, are very closely related to those of Western Mexico. The accompanying note* from Mr. Stimpson will illustrate the character of the crustacea of the Cape.

List of Birds collected from the middle of April to the middle of July, 1859.

1. TINNUNCULUS SPARVERIUS, Vieillot.

2. BUBO VIRGINIANUS, Bonaparte.

3. PICUS LUCASANUS, Xantus.—This species is intermediate in character between *P. scalaris* and *P. nuttalli*, resembling them very closely, and belonging to the same division of the genus. It has the brown feathers on the nostrils, the whole top of the head spotted with red, and the predominance of white on the cheeks of the former, and the deficiency of black bars in the white of the tail feathers of the latter; the black bars, except at the tip, not crossing the outer web, and the outer web of the third feather being almost entirely white. The bill and feet, the latter especially, are very stout and large, much more so than in the others, in *nuttalli*, especially. In size, it is about intermediate between the other two.

4. CENTURUS UROPYGIALIS, Baird.—As in the other woodpeckers, the specimens of this species have a peculiar weather-beaten and dull appearance.

5. COLAPTES CHRYSOIDES, Malherbe.—This bird is only known from an imperfect description by Malherbe of a single female specimen, and this author was ignorant of the peculiar feature of the male of this species, namely, in it combining the characters of both *C. auratus* and *mexicanus*. Thus, with ashy throat and cheeks, and broad, red moustache and absence of nuchal red of the latter, the shafts and under surface of the wing and tail are gamboge yellow, as in *C. auratus*. The tail feathers are more tipped with black than in either species, the outer being of this color for more than the terminal inch, and along most of the outer web. The jugular collar and the spots on the breast are considerably larger than in the other species. The top of the head is light yellowish brown. In size, this species is considerably inferior to that of *C. auratus*.

C. mexicanoides of Lafresnaye has the shafts red.

In the Report on birds of Pacific R. R., Series IX. p. 126, I refer to a female *Colaptes*, collected by Mr. Schott, on the line of the Mexican boundary survey, as possibly of this species. This proves now to be the fact, and extends the range of the species to the valley of the Gila River. The following

*More than sixty species of Crustacea have already been collected by Mr. Xantus, more than half of which are new. They belong to the genera *Pisa, Thoe, Micippa, Mithrax, Pericera, Lambrus, Atergatis, Xanthus, Pilumnus, Ozius, Eriphia, Ocypode, Grapsus, Pachygrapsus, Nautilograpsus, Calappa, Dromidia, Petrolisthes, Remipes, Albunea, Lepidops, Cœnobita, Calcinus, Eupagurus, Alpheus, Palæmon, Livoneca, Ligea, Orchestia, Hyperia*, and several new ones. This new and rich Carcinological Fauna differs entirely from that of the Upper Californian Coast, *not a single species being identical*, and approximates more nearly to that of the Western coast of Mexico, from Guaymas to Acapulco; also in some degree to that of the Gallapagos Islands. Nearly all of the species described by De Saussure as inhabiting the Bay of Mazatlan, (Rev. et Mag. de Zoologie v. 354–368), have been found by Mr. Xantus at Cape St. Lucas.

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detailed description of this little known species may be of interest: Above yellowish ash transversely barred with black. Chin, throat, and sides of head clear ash; under parts white: a broad pectoral crescent, and rounded spots on remaining under parts black. Top of head light brown. Shafts of wing and tail feathers gamboge yellow. Tail black; the basal portion yellow; the outer feathers uniformly black on the exposed terminal half, including the shafts. No red on the nape. Bill black. Iris light brown. Male with a broad, red moustache. No trace of a moustache in the female.

Length of male about 11·00; wing 5·50; tail 4·50; bill above 1·50.

6. COCCOCYX CALIFORNIANUS, Baird.

7. CHORDEILES TEXENSIS, Lawrence.

8. MYIARCHUS MEXICANUS, Baird.—This bird does not appear exactly the same with the species of the United States and Mexico, although I can see no other difference than a rather stouter bill. This, however, appears to be a constant character, and may one day cause its separation as a species (*M. pertinax*, Baird.)

9. SAYORNIS NIGRICANS, Bonaparte.

10. EMPIDONAX OBSCURUS, Baird.

11. HIRUNDO THALASSINA, Swainson.—Much smaller than specimens from Oregon.

12. PROGNE PURPUREA, Boie.

13. PHAINOPEPLA NITENS, Sclater.

14. MIMUS POLYGLOTTUS, Boie.—The specimens do not exhibit the same elongation of the tail as remarked in skins from Upper California. The tail appears, however, a little longer than in specimens from the Atlantic States.

15. HARPORHYNCHUS CINEREUS, Xantus.—This species is very similar in color and markings to *Mimus montanus*, although rather larger, with a considerably longer and more curved bill. It is nearly as large as *H. longirostris*, the bill of about the same length, though more curved. It differs from it, however, in the grayish plumage above, in the whitish tips to the tail, and in having short sagittate spots beneath, instead of elongated black ones. Besides the longer bill and other features, it lacks the rufous tinge of upper parts seen in *H. rufus*. It is smaller than *H. curvirostris*, the spots beneath much more distinct and sagittate. They are darker than the back, instead of being of the same color.

As already remarked, the shade of the coloration and pattern of marking are almost precisely those of *Mimus montanus*, while the bill is much like that of *H. longirostris*.

16. CAMPYLORHYNCHUS AFFINIS, Xantus.—This species is about the size of *C. brunneicapillus*, and resembles it closely in general appearance. The comparison of an extensive series of both will, however, exhibit unmistakable differences.

The anal region and thighs of *brunneicapillus* have a strongly fulvous tendency, (nearly wanting in *affinis*,) and the spots beneath are much smaller, in fact, scarcely more than shaft lines; on the throat and jugulum, on the contrary, the spots occupy almost the entire breadth of the feather, very conspicuously larger than the others. In *C. affinis* the spots beneath are very nearly of the same size, being larger on the belly and smaller on the throat than in the other species: the latter but little the larger.

The lateral tail feathers in *brunneicapillus* are black, all with a subterminal band of white; the external feather has both webs banded with white throughout. The next has a trace of a second terminal band, and there are

bands on the whole of the outer web. The remaining feathers, except the central ones, are banded only on the outer webs; sometimes not then, when the whole feather is black, except at the tip. In the other species, *C. affinis*, all the feathers (except the central) are banded uniformly with white from the base, there being from six to eight on each web, which alternate with each other, the bands being about equal to their black interspaces. The streaks on the back are more distinctly defined than in *brunneicapillus*, and the head above is of a clear, reddish chocolate, instead of the darker brown of the latter species.*

17. POLIOPTILA MELANURA, Lawrence.—The single specimen of this species sent in by Mr. Xantus has the tail feathers more broadly edged and tipped with white, and the gray of the back lighter and clearer than in specimens in the Smithsonian collection from the Gila region.

18. PAROIDES FLAVICEPS, Baird.—Specimens are much smaller than those from the Gila and Rio Grande. The yellow on the head also is brighter. In some there is a tinge of red in the yellow of the crown. Wing of male 1·90 inches.

19. CARPODACUS FRONTALIS, Gray.—Very similar to northern specimens, but smaller. The resemblance to some Rocky Mountain skins in the Smithsonian collection is very close.

20. CHONDESTES GRAMMACA, Bonap.

21. ZONOTRICHEA LEUCOPHRYS, Swains.—It is an interesting fact that this species should be found at the Cape, instead of *gambelii*. It is to be borne in mind that both are found along the Rocky Mountains as far south as El Paso, and that *Z. leucophrys* has not yet been detected in Upper California.

22. CALAMOSPIZA BICOLOR, Bonap.—This species has not yet been detected in Upper California.

23. GUIRACA MELANOCEPHALA, Swainson.

24. CYANOSPIZA VERSICOLOR, Baird.—The female of this species is very similar to those of *C. cyanea* and *amœna*. From the latter it is distinguishable by the absence of traces of two white bands on the wings, and from both by the legs being black instead of dark brown. The bill appears to be more curved, and the legs larger than in the other species.

25. PYRRHULOXIA SINUATA, Bonap.—Smaller than Texan specimens.

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*The following account of common and specific characters may serve to define the species better.

Head above uniform brown; back and scapulars grayish brown, each feather with a central white streak bordered externally by black; upper tail coverts and upper surface of inner tail feathers, obscurely marked transversely with grayish and blackish, other tail feathers black, barred with white. A white streak over the eye and along side of neck. Body beneath white, with rounded spots of black; strongly marked on the under tail coverts.

C. BRUNNEICAPILLUS.—Head above dark brown; black spots on the throat and breast, large, occupying the whole breadth of the end of the feather, the spots on the remaining under parts abruptly much smaller and less numerous. Crissum lower belly and flanks strongly tinged with pale rufous. The black tail feathers, except the outer, scarcely barred with white, except as a subterminal bar.

C. AFFINIS.—Head above dull light chocolate brown; black spots beneath of much the same size and strongly marked on nearly every feather, and but little if any more conspicuous on the jugulum than elsewhere; on the jugulum they are about opposite the middle of the feather (not at the tip) and do not cross both webs; very little trace of rufous any where beneath. All the black tail feathers are crossed with white bands on both webs throughout their whole extent. Length 7·50; wing 3·60; tail 3.25; bill above ·80; tarsus 1·00.

26. CARDINALIS IGNEUS, Baird, n. s.—A Cardinal very abundant at the Cape; appeared at first sight to be the same with the *C. virginianus*. A comparison, however, of a large number of males with as many from the eastern United States and Texas, shows a difference, in the entire absence of black on the forehead between the nostrils, the red of the head coming down to the base of the culmen. The black of the side of the bill extends to the nostrils, but not between them on the forehead as in *virginianus*. The bill is larger and decidedly more tumid. The size, shape and colors are as in *virginianus*, the bill too being red, instead of white as in *phœniceus*.

27. PIPILO ALBIGULA, Baird, n. s.—Specimens of a *Pipilo* with the general aspect of *mesoleucus*, exhibit a constant difference in a rather greater extent of white on the middle of the belly. The chin and upper part of the throat are bounded by a border of dusky spots, which does not extend as far towards the jugulum as in *mesoleucus*, and is much better and more regularly defined below, not being broken up irregularly. The space enclosed by this border of spots is yellowish brown on the chin as in *mesoleucus*, but inferiorly on the throat and in front of the spots it becomes nearly, and sometimes quite white, in decided contrast to the chin color. The bill appears to be more slender. Both forms agree in having the chestnut hood, the dusky spot on the breast, and the white of the belly distinguishing them from *P. fuscus*. The size is that of *mesoleucus* from the Rocky Mountains, and inferior to that of *fuscus*.

28. AGELAIUS ——. — A skin of a female *Agelaius* does not afford characters sufficient to determine a species. It was collected at San José, some ten miles northeast of the point of the cape.

29. ICTERUS PARISORUM, Bonap.—The female of this species is olivaceous above, (lighter on the rump,) and yellow beneath. The tail feathers, except the middle ones, are greenish yellow, becoming grayish brown on the terminal third (which is black in the male,) and narrowly tipped with whitish. There are two distinct bands of white on the wing. The lores and throat are tinged with dusky.

30. ICTERUS CUCULLATUS, Swainson.

31. CYANOCITTA CALIFORNICA, Strickland.—Rather smaller than more northern specimens, but apparently similar. There is, however, a tendency to the blue tinge of the under tail coverts seen in *C. woodhousii*, Baird.

32. MELOPELIA LEUCOPTERA, Bonap.—A very abundant species.

33. CHAMÆPELIA PASSERINA? var. PALLESCENS, Baird.—A comparison of an extensive series of *Chamœpelia* from Cape St. Lucas, with a similar one from the Southern Atlantic States, shows constant differences in the shade of coloration which may be of importance. The pattern is the same, but the shades are considerably lighter. The chin and anal region are nearly white, the color of the latter considerably lighter than that of the belly anterior to it, instead of being much the same. The amethystine spots on the wings are smaller and apparently less numerous. The bill seems darker, all the hard portion being black, instead of this color being confined to the tip. The tertials do not appear to extend so far along the wing, falling short of the tip by about three-quarters of an inch, scarcely reaching to the end of the eighth primary, instead of to within less than half an inch or to the end of the fifth or sixth primary. The tarsi appear stouter in the Cape bird.

34. LOPHORTYX CALIFORNICUS, Bonap.

35. GARZETTA THULA, Bonap.?—A white heron (No. 273) closely allied to *G. candidissima* appears to be immature, being without the plumose, occipital and dorsal feathers. It differs from *candidissima* in the longer bill (3·50 in. above, instead of 3.15), and in the shorter tarsi (3·60 instead of 4·05.) The

toes too are shorter. The lower mandible is yellow along the entire line of the gonys, and laterally for the basal half. The toes, though evidently not black orginally like the tarsi, are yet of a greenish black in the dried specimen, quite distinct from the decided yellowish of the other species.

An examination of the adult will be necessary to show whether this bird is really the *thula* of Chili or not. It is certainly larger and otherwise different from specimens brought from Chili by Lt. Gilliss.

36. Aegialitis vociferus, Cassin.

37. Calidris arenaria, Illiger.

38. Fulica americana, Gmelin.

39. Graculus dilophus? Gray.—Immature.

40. Thalassidroma melania, Bonap.—A single specimen of this species was collected by Mr. Xantus. I have seen one other obtained near San Francisco by Mr. Gruber of that city.

41. Blasipus heermanni, Bonaparte.—Young birds only collected.

42. Brachyrhamphus hypoleucus, Xantus.—The occurrence of a species of this genus as a summer visitor to a point so far south as Cape St. Lucas, or at the latitude of less than 23° N. is a fact of much interest, when we remember that the auks have all been considered more or less arctic birds. The affinities of the new species appear to be chiefly with *B. marmoratus*, although it lacks the white scapulars, has the inside of the wing white, instead of sooty, and much longer tarsi. Its relations to *B. brachypterus*, *kittlitzii* and *wrangelii* of Brandt it is difficult to determine from the short descriptions of that author. It come closest to the description of *B. brachypterus*, but the tarsus is shorter than the middle toe, not longer.

MINERALOGICAL NOTES.—No. II.

BY WILLIAM JOHNSON TAYLOR.

The number of interesting minerals which have been referred to me by gentlemen of the Academy, are but partially described in the present paper. Descriptions and analyses of several minerals of interest, including at least one new species, I have been obliged to defer for a subsequent communication to the Academy.

Clayite—*a new mineral.*

This mineral is remarkable as being near galena in form and composition, being a sulphide of lead with about twenty-five per cent. of arsenic, antimony and copper, forming the third of a series of which galena is the first, cuproplumbite (found in an adjoining State, Chili) is second, and which contains some copper and sulphur, but not any antimony and arsenic. In the cuproplumbite the lead is partially replaced by copper, and in Clayite this also is the case, but a part of the sulphur is also replaced by antimony and arsenic.

Clayite is remarkable as containing so small a per centage of sulphur—between eight and nine per cent. only. It occurs in small monometric crystals, the predominating form of which appears to be a combination of the tetrahedron with the dodecahedron; they occur as a coating on a layer of quartz, about a thirty-second of an inch in thickness, which incrusts the massive portion of the mineral. This massive portion of the mineral is filled with minute quartz crystals, which are microscopic, but the presence of this quartz and the existence of minute fissures has permitted the mineral to be somewhat acted upon by the air, and to suffer a probably partial decomposition, as is evinced

by the decolorization of the surface by a bronze tarnish and the occurrence in the crevices of the blue Covelline (?).

The crystals of Clayite do not appear to be in the least acted upon. In color they are a blackish gray, are quite small, the form only to be distinguished by a strong pocket lens, and no cleavage observed. Rubbed in an agate mortar, they are quite malleable, though at first quite frangible. Streak black gray; sectile. Hardness about 2·5.

Before the blow-pipe on charcoal it fuses easily, giving a yellow incrustation surrounded by a white incrustation; with carbonate of soda a strong alliaceous odor, and a brilliant metallic globule when hot, which becomes dull and lustreless on cooling.

The crystals, as before mentioned, coated a thin layer of quartz, on which they were associated with small crystals of chalcopyrite. They were carefully freed from all extraneous matter, and the analyses gave the following results:

	I.	II.
Sulphur,	8·22 per cent.	8·14
Arsenic,	9·78 "	
Antimony,	6·54 "	
Lead,	68·51 "	67·40
Copper,	7·67 "	5·62
Silver,	trace.	
	100·72	

The less amounts of lead and copper in (II.) are to be accounted for by the crystals taken for analysis having small particles of the amorphous portion adhering.

	Per cent.	Quotient.	Ratio.
Sulphur,	8·22	0·514	10·3
Lead,	68·11	0·658	13·16
Copper,	7·67	0·242	4·8
Arsenic,	9·78	0·130	2·6
Antimony,	6·54	0·050	1·0

By taking 2 Cu = 1 Pb, we have the formula

$$\begin{matrix} Pb \\ Cu \end{matrix} \Big| \begin{matrix} S \\ As \\ Sb \end{matrix} \Big|$$

Owing to the partial decomposition of the amorphous portion, extending generally through the specimen by the minute cracks and its minute quartz granules, no positive composition can be assigned to it.* The following are the results of a determination of the bases and a calculation of their ratio after the subtraction of the quartz:

		By calculation.
Quartz,	25·73 per cent.	
Lead,	51·32 "	69·11 per cent.
Copper,	2·31 "	3·11 "
Sulphur,	6·75 "	9·09 "
(Antimony and Arsenic) loss,	13·89 "	18·69 "
	100·00	100·00

	Per centage.	Quotient.	Ratio.
Sulphur,	9·09	0·564	5
Arsenic and Antimony,	18·69	0·191	2
Copper,	3·11	0·098	1
Lead,	69·11	0·664	6·5
	100·00		

* The intimate mixture of quartz through the massive portion of the mineral gives it a lighter color.

Again calculating 2 Cu = Pb, we have the same formula as with the crystals.

$$\frac{Cu}{Pb}\left|\begin{matrix}As\\Sb\\S\end{matrix}\right|$$

I have seen but one specimen of this mineral, which was given me by Joseph A. Clay, Esq., having been sent to him from Peru by his brother Hon. J. Randolph Clay, United States Minister to that country. It was labelled—"Pabonado en Rocicler de Aranzazu." The appearance of the massive mineral is not unlike some of the gray coppers, though its color is more of a bluish gray. This peculiarity together with the bronze tarnish of its surface, with the blue spots of Covelline (?) and the excess of lead as shown by blow-pipe examination, induced me to make a quantitative analysis of both the massive mineral and the crystals. The entire specimen was small, and the proportion of the crystallized mineral being also small, I was obliged to make the examination with a very limited amount of material. The determination of the specific gravity must be deferred until more of the mineral is obtained.

I name this mineral in honor of the Messrs. Clay, whose interest and exertions in mineralogy are so well known to mineralogists in this country and abroad.

The protracted illness of Prof. J. D. Dana, and his subsequent departure for Europe, prevented his measurement of the microscopic crystals which I had sent to New Haven.

Stromeyerite.

The specimen of this mineral which I obtained from the cabinet of Joseph A. Clay, Esq., was remarkable as resembling, in many of its characters, the mineral Sternbergite more than Stromeyerite. A blow-pipe examination, in which I found copper, together with the want of flexibility in the crystals, and their high lustre, led me to refer the mineral to Stromeyerite. To decide this doubtful point, I picked out with difficulty a little of the pure mineral for analysis.

The mineral is from Copiapó, Chili. It occurs in small six-sided aggregated crystals belonging to the trimetric system, not exceeding an eighth ($\frac{1}{8}$) of an inch in diameter, which are implanted on minute quartz crystals, forming rose-like or fan-like clusters, having the striæ of O distinctly marked, and with striæ on the edges. In its appearance (as before mentioned) it is more like Sternbergite, but differs by the absence of flexibility, and also possesses more lustre than any specimens of Sternbergite which I have seen.

Hardness from 2·5 to 3. Lustre metallic: color dark steel gray: streak nearly black and shining. Sectile, does not soil paper: crystals brittle.

The Stromeyerite occurs in small veins and fissures in barytes, the sides of which are lined with very small quartz crystals and associated with small crystals of Pyrargyrite.

Before the blow-pipe on charcoal fuses to a white globule, somewhat malleable, which, with the fluxes, gives the reaction of copper: with carbonate of soda gives the reaction of sulphur.

The following are the results of my analyses:

	I.	II.	III.
Sulphur	16·35 per cent.	16·49 per cent.	
Silver	69·59 "	"	66·39
Copper	11·12 "		
Iron	2·86 "		
	99·92		

The silver determination of (III.) was from some impure crystals containing a little Pyrargyrite.

	Per cent.	Quotient.	Ratio.
Sulphur	16·35	1·02	10·2
Silver	69·59	0·64	6·4
Copper	11·12	0·36	3·6
Iron	2·86	0·10	1·0

By taking 2 Cu = Ag. we have the formula (Ag Cu Fe) S or 6 Ag S + 2 Cu S + Fe S.

Polybasite.

I am indebted to Joseph A. Clay, Esq., also, for a duplicate specimen of an undetermined mineral, which he lately received from Peru, labelled "A compact silver ore from San Pedro Nolasio, Tres Puntos, near Copiapó." From a fragment of a crystal I made an approximative analysis, which proves the mineral to belong to this species, as I have with the quantity at my disposal (0·0814 grammes,) been able with care to determine the proportion of the sulphides of silver and copper, which prove by the excess of base, that the mineral is of the species so appropriately named Polybasite.

The specimen which I have, contains short tabular hexagonal crystals, the terminal planes of which show the triangular striæ. These crystals are imbedded in crystallized gypsum, and are more developed by keeping the specimen for a short time in cold water. Calcite in scaleneohedrous crystals, minute portions of blende and pyrites were also associated in the specimen.

Hardness about 2. Lustre metallic: color between steel gray and iron black. Streak, iron black. Opaque sectile, brittle, soft. Fracture uneven.

The following are the results of my analyses:

	Per cent.	Quotient.	Ratio.
Sulphur	16·14	1·0	8
Silver	64·18	0·59	5
Copper	8·13	0·26	2
(Arsenic and Antimony) loss	11·55	0·12	1
	100·00		

From which may be deduced the formula:—5 Ag S + Cu S + (As Sb) S_3.

Glaserite (?)

In No. 1 of "Mineralogical Notes," published in the Proceedings of the Academy of Natural Sciences for August, 1858, I mention a mineral which I found among some specimens recently presented to the Academy, brought from the Chincha Islands of the Pacific Ocean; it was labelled "Ammonia." From its appearance I suspected it to be a sulphate. By a qualitative analysis the sulphate of ammonia was found to be combined with a sulphate of one of the fixed alkalies, which I then supposed to be principally soda. By a quantitative analysis I now find that the quantity of soda is a minimum, and that the principal alkali is potash. The salt is therefore really a double sulphate of potash and ammonia, and notwithstanding the probability of its being a distinct salt and a new mineral species, I will, for the present, refer it to Glaserite, with a mark of interrogation. There is mentioned in Gmelin's Handbook of Chemistry, (Cavendish edition, vol. iii. p. 71,) a sulphate of potash and ammonia, which from the description therein given, accords with this mineral, ("scaley, shining, bitter crystals, unacted upon by the air and leaving neutral sulphate of potash when ignited.") Not one analysis is given, neither is the proportion of potash and ammonia mentioned, but reference is made to an article on this substance (artificial double sulphate of potash and ammonia) by Link, Chemische Annalen von Dr. Lorenz Crell, 1796, i. 29, to which work it is not in my power to refer.

The glaserite (?) is in compact lumps or concretions about the size of hickory nuts; the color is yellowish white, with a crystalline structure; taste pungent and bitter opaque; permanent in the air. Hardness about 2. Reaction with litmus paper perfectly neutral. Before the blow-pipe on platinum foil, blackens and fuses with difficulty, leaving a white bead which is soluble in water and tastes a little saline and bitter. When heated in a platinum crucible it becomes first black and then burns perfectly snow-white, not fusing at a high heat.

The following are results of my analyses:

	I.		II.	
Sulphuric acid	48·40	per cent.	48·30	per cent.
Ammonia	5·87	"	5·10	"
Potash	43·45	"	46·49	
Soda	1·68			
Organic matter	trace		trace	
	99·90		99.89	

	Per cent.	Oxygen ratio.	
Sulphuric Acid	48·35	28·96	
Ammonia	5·23	1·60	9·37
Potash and Soda	45 81	7·77	

From which may be deduced the general formula (KO, NH_4 O) SO_3.

Description of new species of the Coleopterous family Histeridæ.

BY JOHN LE CONTE.

In the year 1845, when I published a Monograph of the American Histeridæ in the Boston Journal of Natural History, my memoir contained seventy-nine species. There were probably at that time contained in European collections, about two-hundred and fifty species collected from all parts of the world. Since then, the Abbé de Marseul has published his great work, "Essai monographique sur la famille des Histerides," and furnished accurate descriptions of six hundred and twenty species, besides collecting from other writers one hundred and twenty-six more which he has not been able to see. Of these, forty-five species were brought by my son from California. I now add twenty-five species from our own country, from Central America, and from Cuba, with one from Africa, making the whole number at present known to be seven hundred and seventy-two.

To what sum this may hereafter be increased, it is impossible to say, a great part of California has not yet been explored, and the States of New Mexico and Texas have as yet yielded very few. It is remarkable that among the numerous collections made by different exploring parties, so few of this family of insects have been found. Perhaps they may have found it disagreeable to look for them in the peculiar situations where most of them inhabit.

I add a few words respecting the name Hister. This word is said to be derivpd from the Latin Histrio, or Etruscan Histrion, meaning a player, on account of some few of them having red marks on the elytra, or from their feigning death (as a vast number of insects do) when first caught, which derivation appears inappropriate. The Roman poet D. J. Juvenalis in his second satire, verse 21, mentions a filthy fellow of the name of Hister. Linnæus was fond of alluding to the classic writers of Rome, and finding these insects living in the most filthy conditions, very properly gave this name to animals found in the midst of excrements and putrefaction.

Hololepta princeps. Oblongus, niger, nitidus, capitis lateribus utrinque linea longitudinali impressis; mento concavo profunde emarginato; pronoto linea dorsali a basi ad medium, stria marginali antice profundiore; elytris striis duabus ad basin, interna minima, externa brevi, fossa lateralis postice attenuata; propygidio antice ad latera persparse grosse punctato, pygidio sat dense punctato; epipleuris rugosulis unistriatis; corpore subtus medio impunctato, tibiis anticis et intermediis quadri-dentatis, posticis tridentatis.

Tejon Pass, California; John Xantus, Esq.

Oblong, black, shining, sides of the head with a small longitudinal line impressed on each side; chin concave, deeply emarginate. Thorax with a

dorsal line reaching from the base to the middle, marginal stria deeper on the fore part. Elytra parallel, with two striæ at the base near the shoulder, the internal one very small, the external one more apparent but short, lateral fossa profound, attenuated behind. Propygidium anteriorly at the sides very sparsely and coarsely punctate, pygidium tolerably densely punctate. Epipleuræ rugosulous, unistriate. Body beneath impunctate, the pleuræ very thickly and coarsely punctate. Prosternum rounded at the apex, with an anterior oblique margin on each side. Antic and intermediate tibiæ four-toothed, the posterior three-toothed. Length ·67 : including the jaws ·8.

By far the largest of the known species of this family. The Oxysternus, hitherto considered the largest Histeroid, is ·5 in length.

Omalodes r o t u n d a t u s . Rotundus, convexus, niger nitidus, fronte stria circulari integra medio paulo emarginata; pronoto lateribus impunctatis; elytris stria dorsali prima integra, secunda postice abbreviata, tertia medio interrupta, quarta utrinque abbreviata, suturali basali, parva, brevi.

Mexico.

Round, convex, black, very shining; front impressed with a circular entire stria, a little emarginated in the middle. Thorax stria entire, ambient, the sides impunctate. Elytra with the shoulders projecting, humeral stria scarcely apparent, subhumeral abbreviated in the middle, first dorsal subentire, second abbreviated behind, third interrupted in the middle, fourth abbreviated on both sides and placed opposite the interruption of the third, sutural small, short, basal. Epipleuræ, sternum and mesosternum impunctate, the first unistriate. Propygidium thinly, pygidium densely punctate. Antic tibiæ four-toothed. Length ·35.

Phelister a f f i n i s . Ovalis, convexus, niger, nitidus fronte concava; pronoto punctiulato, stria marginali integra; elytris lævissimis, striis punctatis, dorsalibus quatuor primis integris, quinta et suturali æqualibus, antice ante medium abbreviatis, subhumerali ante medium antice valde abbreviata; pygidio punctato.

Mexico.

Oval, convex, black, shining, frontal stria rounded. Thorax entirely punctiulate, the marginal stria entire. Elytra very smooth, the striæ punctate, first four dorsal equal, entire, the fifth and sutural equal, abbreviated anteriorly before the middle, subhumeral anteriorly very much abbreviated. Epipleuræ impunctate, bistriate. Pygidium rather scatteringly punctured. Feet brownish antic tibiæ 5-toothed. Long ·1.

Phelister m a r g i n e l l u s . Ovalis marginatus, convexus, rufus, nitidus impunctatus, fronte concava; pronoto stria marginali integra, ambiente; elytris striis impunctatis, dorsalibus quatuor primis integris, æqualibus, quinta et suturali ante medium antice abbreviatis, subhumerali integra.

Maryland.

Oval widely margined, convex, rufous, shining, impunctate; front excavated. Margin of the thorax projecting and containing the marginal stria which is entire and ambient and leaves a narrow raised cushion on the fore part. Elytra with the first four dorsal striæ entire and equal, the fifth and sutural abbreviated anteriorly before the middle, all of them impunctate, subhumeral entire, placed on the margin. Pygidium punctate; antic tibiæ indistinctly five-toothed. Length ·1.

Phelister P a n a m e n s i s . Ovalis, convexus, piceus, nitidus, fronte leviter concava; pronoto ad latera puncticulato, estriato; elytris striis dorsalibus quatuor primis integris, quinta et suturali abbreviatis, stria subhumerali antice abbreviata, pygidio dense punctato.

Panama.

Oval, convex, pitchy, shining, front lightly concave: thorax puncticulate on the sides, without a stria, marginal stria entire. Elytra with the four first dorsal

striæ entire, equal, the fifth abbreviated anteriorly much behind the middle, the sutural before the middle; epipleuræ and mesosternum impunctate, the former bistriate, pygidium densely punctate. Feet rufous, antic tibiæ with six small teeth. Length ·1.

Resembles the Ph. vernus; but differs in the less concave front, in the longer sutural stria, and in the punctate pygidium; the Ph. vernus has this part very finely puncticulate, it is likewise a little larger.

Hister hospitus. Subrotundus, convexus, niger, nitidus, stria frontali subsinuata; pronoto unistriato; elytris striis tribus dorsalibus primis integris, quarta et quinta obsoletis, suturali ante medium antice abbreviata, subhumerali nulla; propygidio utrinque ad latera impresso; tibiis anticis tridentatis.

Western States.

Roundish convex, black, shining, impunctate, frontal stria subsinuate, mandibles toothless. Thorax with one entire stria, the descending portion of which forms a right angle with the part in front. Elytra with the first three dorsal striæ entire, equal, the fourth and fifth obsolete or only marked by an apical and basal point, sutural anteriorly abbreviated before the middle, subhumeral none; epipleuræ punctate bistriate. Propygidium with an impression on each side and with the pygidium densely punctate, mesosternum very slightly emarginate. Antic tibiæ tridentate, the anterior tooth large. Length ·2.

Hister regularis. Ovalis, parum convexus, niger, nitidissimus, impunctatus, fronte stria subplana; pronoto striis duabus externa abbreviata, interna integra; elytris striis tribus dorsalibus primis integris, quarta et quinta medio antice abbreviatis, suturali ante medium antice abbreviata, subhumerali medio antice abbreviata, pygidio punctato; tibiis anticis tridentatis.

Africa.

Oval, a little convex, black, very shining, impunctate, frontal stria nearly plain, a little incurved in the middle, mandibles strong, two-toothed, deeply longitudinally excavated. Thorax bistriate, the external stria much abbreviated posteriorly before the middle, the interior entire, sinuate in the middle, the marginal very lightly marked. Elytra a little narrowed behind, with impunctured striæ, the first three equal, entire, fourth and fifth abbreviated anteriorly in the middle, the sutural a little before the middle, subhumeral impunctate, pygidium punctate. Antic tibiæ tridentate. Length ·35.

Hister granadensis. Suboblongus, convexus, niger, nitidus, stria frontali sinuata; pronoto bistriato, striis subequalibus, subintegris; elytris striis quatuor dorsalibus primis integris, quinta, suturali et subhumerali antice abbreviatis; propygidio utrinque impressione profunda laterali et cum pygidio punctato; tibiis anticis quadridentatis.

Panama.

Rather oblong, convex, black, shining. Head punctate, slightly impressed, stria sinuate. Thorax very finely puncticulate, bistriate, striæ subequal, subentire the outer one a little more abbreviated than the inner. Elytra smooth, the first four dorsal striæ equal, entire, fifth very much abbreviated behind the middle, sutural abbreviated before, subhumeral in the middle; epipleuræ bistriate; propygidium with a deep lateral impression on each side, and with the pygidium thickly punctured. Antic tibiæ four-toothed, the anterior tooth bifid, the posterior minute. Length ·26.

Resembles H. connosus.

Hister defectus. Rotundus niger, nitidus, stria frontali rotundata; pronoto bistriato, stria interiore integra exteriore ante medium postice abbreviata: elytris striis quatuor dorsalibus primis integris, quinta nulla vel punctorum merum, suturali abbreviata, subhumerali nulla: tibiis anticis quadridentatis.

New York to Georgia.

Roundish, black, shining, impunctate except on the head, frontal stria

rounded, mandibles one-toothed. Thorax bistriate, the inner stria entire, the outer posteriorly abbreviated before the middle. Elytra with the first four dorsal striæ entire, equal, the fifth a mere point or altogether wanting, the sutural anteriorly abbreviated before the middle and posteriorly towards the apex, subhumeral none; epipleuræ punctate, bistriate. Mesosternum punctate, entire; pygidium coarsely punctate. Antic tibiæ four-toothed, the anterior tooth emarginate. Length ·15.

Hister ambigena. Subrotundus, subconvexus, niger nitidus punctulatus, stria frontali antice plana; pronoto striis duabus inequalibus, exteriore postice valde abbreviata, interiore integra: elytris striis omnibus dorsalibus integris, quinta et suturali antice connexis, subhumeralibus duabus antice abbreviatis; tibiis anticis tridentatis.

Vermont.

Roundish, subconvex, black, shining, punctulate; frontal stria plane in front. Mandibles toothless. Thorax bistriate, the interior stria entire, the exterior posteriorly abbreviated before the middle. All the dorsal striæ of the elytra with the sutural entire, equal, this last connected anteriorly with the fifth at the base, subhumeral two anteriorly abbreviated, the exterior one longer, epipleuræ punctate unistriate pygidium punctate, mesosternum not emarginate. Antic tibiæ tridentate; anterior tooth emarginate. Length ·175.

Hister furtivus. Subrotundus, niger, nitidus, impunctatus; pronoto bistriato, stria exteriore postice abbreviata; elytris striis tribus exterioribus integris equalibus, quarta antice abbreviata, quinta basali, suturali utrinque abbreviata, humerali distincta, subhumerali vix ulla, epipleuris punctatis, tristriatis; prosterno antice truncato, utrinque dente parvo armato; tibiis anticis tridentatis.

Georgia.

Roundish, black, shining, impunctate, frontal stria entire rounded. Thorax bistriate, exterior stria posteriorly abbreviated below the middle. Elytra, first three dorsal striæ entire, fourth anteriorly abbreviated in the middle, fifth basal, a mere point, or entirely wanting, sutural anteriorly abbreviated, humeral distinct, subhumeral scarcely any; epipleuræ punctate, with three striæ, the third one rudimentary; prosternum truncate at the apex with a small tooth on each side, propygidium and pygidium punctate, the first with an impression on each side. Antic tibiæ three-toothed. Length ·4.

Very much resembles the H. depurator, but this last has the prosternum rounded at the apex, bent down and margined, it likewise has the sutural stria sometimes entire, but oftener abbreviated on both sides.

Epierus mehicanus. Ellipticus, convexiusculus, niger nitidus, fronte convexa, impunctata; pronoto dense puncticulato, stria marginali integra; elytris impunctatis, striis omnibus integris punctatis, marginali integra leviter impressa; epipleuris punctatis, unistriatis.

Mexico.

Elliptic, rather convex, black, shining, head impunctate, front convex. Thorax densely puncticulate, marginal stria lightly impressed, entire. Elytra smooth, impunctate, all the striæ entire, equal, punctate, the marginal or subhumeral entire, slightly impressed, epipleuræ punctate, unistriate. Pygidium densely puncticulate. Feet black. Length ·125.

Epierus elliptícus. Ellipticus, subdepressus, niger, nitidus, fronte convexa punctículata, pronoto dense puncticulato, stria marginali integra; elytris impunctatis, striis omnibus integris punctatis, subhumerali sive marginali fortiter impressa, epipleuris punctatis unistriatis.

Southern States.

Elliptic, rather depressed, black, shining, front convex, puncticulate. Thorax densely puncticulate, marginal stria entire, tolerably strongly impressed. Elytra impunctate, all the striæ punctate, entire, the marginal or subhumeral,

entire, strongly impressed, epipleuræ punctate, unistriate. Pygidium densely puncticulate. Feet dark rufous. Length ·1.

Epierus devius. Elliptieus convexiusculus, niger, nitidus, impunctatus; fronte convexa; pronoto stria marginali integra; elytris striis dorsalibus impunctatis quinque integris, suturali basi valde ante medium abbreviata, marginali integra; epipleuris punctatis unistriatis.

Mexico.

Elliptic, rather convex, black, shining, impunctate. Front convex, not puncticulate. Thorax marginal stria entire. Elytra the five dorsal striæ entire, equal, impunctate, the inner ones more lightly impressed, the sutural abbreviated at the base much beyond the middle, the marginal or subhumeral entire; epipleuræ punctate, unistriate. Pygidium densely punctulate, feet black. Length ·13.

Carcinops geminatus. Subrotundus, convexiusculus, punctatus, niger, nitidus; pronoto stria marginali nulla, antice utrinque impresso; elytris striis punctatis, quatuor primis dorsalibus integris, æqualibus, quarta basi versus suturam arcuata; quinta et suturali antice abbreviatis, interstitiis sulcatis, subhumerali ante medium abbreviata, tibiis anticis tridentatis.

New York.

Roundish, rather convex, punctate, black, shining. Front convex. Thorax without any marginal stria. Elytra with the striæ deeply impressed, punctate, the four first equal, entire, the fourth curved at the base towards the sutural, the fifth abbreviated anteriorly before the middle, sutural nearly entire, the interstices of the elytra deeply sulcate, so that the striæ appear geminate, subhumeral abbreviated before the middle; epipleuræ punctate, bistriate; antic tibiæ tridentate. Length ·13.

Carcinops parvulus. Ovalis, depressus, niger, nitidus, fronte punctulata plana, non striata, pronoto lævi lateribus punctulatis, stria marginali integra von ambiente, elytris striis quatuor primis dorsalibus integris, quinta et suturali antice abbreviatis, subhumerali nulla, epipleuris lævibus bistriatis; pygidio grosse punctato.

Cuba.

Oval depressed, black, shining, front puncticulate, plane, without a stria. Thorax smooth, puncticulate on the sides, marginal stria entire, not ambient. Scutellum very apparent. Elytra smooth, impunctate, striæ punctate, first four dorsal equal, entire, fifth abbreviated anteriorly before the middle, the sutural at the middle, subhumeral none: epipleuræ impunctate, bistriate; pygidium coarsely punctate. Feet black, antic tibiæ tridentate. Length ·07.

Paromalus estriatus. Ovatus, depressus, niger, nitidus, supra totus punctulatus; fronte convexiuscula; pronoto stria marginali non ambiente; elytris estriatis.

Pennsylvania.

Ovate, depressed, black very shining, above puncticulate, beneath impunctate. Front convex. Thorax straight at the base, marginal stria entire, not ambient. Elytra without any striæ, the subhumeral line alone wanting. Epipleuræ bistriate. Pygidium dædalous. Antic tibiæ four-toothed. Length ·1.

Paromalus parallelus. Oblongus, depressus, niger, nitidus, dense puncticulatus, fronte estriata, pronoto stria marginali integra; elytris striis exteriore basali postice abbreviata, striis aliisque tribus mediamis utrinque valde abbreviatis, suturali medio antice abbreviata.

Cuba.

Oblong, depressed, black, shining, densely puncticulate; front without a stria, a little convex. Thorax marginal stria entire. Scutellum not visible. Elytra with the sides parallel, with four dorsal striæ on each, the external one basal

posteriorly very much abbreviated before the middle, the three others in the middle of the elytra very much abbreviated before and behind, sutural anteriorly abbreviated in the middle, subhumeral or marginal none; epipleurs bistriate: feet dark brown, antic tibiæ with four teeth. Length ·1.

Saprinus latubris. Ovalis, niger, nitidus, fronte puncticulata; pronoto lateribus et basi punctatis; elytris postice diagonaliter extrorsum punctatis, lateribus impunctatis; striis omnibus dorsalibus postice pone medium abbreviatis, prima et secunda longioribus inæqualibus, tertia et quarta brevioribus æqualibus, quarta cum suturali integra connexa, subhumerali minima; tibiis anticis crenatis.

Western States.

Oval, black, shining, front puncticulate. Thorax punctate on the sides and base, marginal stria entire. Elytra diagonally and outwardly punctate behind, the sides smooth, dorsal striæ all abbreviated behind the middle, the first and second longer, unequal, the third and fourth shorter and equal, the fourth joined to the sutural, which is entire, subhumeral a mere point. Epipleuræ smooth. Pygidium punctata. Antic tibiæ crenate. Length ·1.

Saprinus sterquilinus. Rotundus, niger nitidus, capite punctato, vertice impresso, stria frontali nulla, pronoto lateribus punctatis, disco punctulato; elytris postice punctatis, striis dorsalibus postice abbreviatis per paria subæqualibus, quarta versus suturam arcuata, suturali antice ante medium, postico vero paulo abbreviata, subhumerali utrinque abbreviata, tibiis anticis spinoso-denticulatis.

Cuba.

Round, black, shining, head puncticulate, vertex impressed with a small fovea, stria none. Thorax puncticulate on the sides and base punctate. Elytra diagonally, outwardly and downwardly punctate, except on the sides, dorsal striæ abbreviated behind, equal by pairs, the outer ones the longest, the outermost one deeply and broadly impressed, the fourth one curved before but not joined to the sutural, which is abbreviated anteriorly before the middle and likewise a short instance from the apex, subhumeral very much abbreviated both before and behind. Epipleuræ and mesosternum punctate. Antic tibiæ spinoso-denticulate. Length ·13.

Saprinus discors. Ovalis convexus, niger, nitidissimus, fronte puncticulata, stria nulla; pronoto lateribus et basi punctatis, hoc anguste, illis latius; elytris postice punctatis, striis omnibus dorsalibus postice abbreviatis, prima pone medium, ceteris medio abbreviatis æqualibus, stria suturali postice abbreviata, subhumerali utrinque abbreviata; tibiis anticis pluri-dentatis.

Mexico.

Oval, convex, black, very shining. Head punctate, stria none. Thorax puncticulate, widely punctured on the sides, and narrowly on the base, marginal stria entire. Elytra diagonally, outwardly and downwardly punctate, except on the sides, dorsal striæ profoundly punctate, the first abbreviated beyond the middle, the three others at the middle and equal, the fourth joined to the sutural, which is abbreviated behind, the subhumeral abbreviated on both sides. Prosternum finely punctured, mesosternum the upper part coarsely punctate, the lower puncticulate. Epipleuræ impunctate. Length ·15.

Saprinus scrupularis. Niger, nitidus, fronte puncticulata, stria nulla: pronoto puncticulato, lateribus late punctatis; elytris punctatis, striis dorsalibus subæqualibus postice abbreviatis, quarta cum suturali antice connexa, tertia paulo longiore, subhumerali antice medio abbreviata; pygidio dense puncticulato, epipleuris mesosternoque grosse punctatis; tibiis anticis sex-dentatis.

Georgia.

Black or pitchy, shining, front convex, puncticulate, stria none. Thorax puncticulate, the sides widely punctate, marginal stria entire. Elytra entirely punc-

tate except on the sides, subhumeral stria anteriorly abbreviated in the middle, the dorsal striæ generally equal, the third sometimes a little longer than the others, all of them abbreviated behind the middle, the fourth anteriorly united with the sutural, which is entire. Epipleuræ and mesosternum coarsely punctate. Pygidium thickly punctulate. Legs dark brown. Antic tibiæ sexdentate. Length ·09.

The smallest species of this genus.

Saprinus olidus. Niger nitidus, fronte puncticulata; pronoto lateribus et basi dense puncticulato, stria marginali integra; elytris postice dimidio et lateribus dense aciculato-punctatis, area scutellari magna nitidissima, stria subhumerali antice abbreviata, striis dorsalibus subæqualibus quarta cum suturali antice connexa, suturali integra.

Texas.

Round, black, shining, front puncticulate on the sides and base, marginal stria entire. Elytra densely aciculato-punctate behind for one-half their length and on their sides, subscutellar area large, very shining, subhumeral stria abbreviated before, dorsal striæ equal, abbreviated behind the middle, the fourth united to the sutural, which is entire. Pygidium densely punctate. Epipleuræ and mesosternum coarsely punctured. Legs dark brown, antic tibiæ many-toothed. Length ·1.

Saprinus fulgidus. Rotundus, piceus nitidus, fronte simplici puncticulata; pronoto toto punctato; elytris punctatis, area subscutellari nitidissima, striis dorsalibus postice abbreviatis, secunda longiore tertia et quarta æqualibus, quarta cum suturali connexa; suturali integra, subhumerali antice ante medium abbreviata.

Cuba.

Round, pitchy, shining, submetallic, front simple, puncticulate. Thorax entirely punctate, marginal stria entire. Elytra punctate with a smooth very shining, subscutellar area, upper part of the sides impunctate, dorsal striæ abbreviated behind, the second the longest, the third and fourth equal, the last joined to the sutural which is entire, subhumeral abbreviated anteriorly before the middle. Pygidium and mesosternum punctate. Legs brown. Antic tibiæ many-toothed. Length ·1.

Hetærius setiger. Rotundus, convexus, rufo-piceus, nitidus; pronoto marginato, parce granulato et setoso; elytris seriatim setosis, striis tribus externis elevatis, internis punctatis.

Found in Habersham Co., Georgia, in the nest of a small species of ant under the bark of a tree.

Round, convex, rufo-piceous, shining. Front concave, with three short diverging crests. Thorax twice as broad as it is long, narrowed anteriorly, the sides widely rounded with a prominent margin, the disk thinly granulated, each granule furnished with a short erect bristle. Elytra a little wider than the thorax, the sides widely rounded with six striæ on each, the internal ones not impressed, confusedly punctate, the external ones slightly elevated, punctate, all the punctures setigerous. Pygidium thinly and rudely granulate. Antic tibiæ dilated with a spinulous margin. Length ·06.

Teretrius americanus. Cylindricus, elongatus, niger, estriatus, totus punctatus, capite magno fronte convexa; pronoto antice paulo declivi, lateribus subsinuatis leviter marginato; elytris parallelis, convexis, lateribus rotundatis.

Middle States.

Cylindrical, elongated, black, estriate, entirely punctate. Head large, front convex, antennæ rufous. Thorax oblong, longer than it is wide, convex, rounded and subsinuate on the sides, with a very slight margin, the marginal stria is only apparent on the anterior angles of the thorax and runs but a short distance

on each side. Elytra rufous on the sides, parallel, convex, cut off square at the apex, densely and distinctly punctured, suture a little raised. Epipleuræ bistriate. Legs rufous. Antic tibiæ dilated, five-dentate. Length ·1.

The European species, to which this is very nearly allied, has no margin to the thorax, but merely a marginal stria. Our species wants the small furrow at the exterior base of the margin of the thorax. The thorax is moreover more finely and sparsely and the elytra more coarsely punctate.

In my Monograph of these insects, the American was considered identical with the European species.

Contributions to American Lepidopterology.—No. 2.

BY BRACKENRIDGE CLEMENS, M. D.

TINEINA.

LITHOCOLLETIDÆ.

Imago with pointed or almost caudate anterior wings, with the costal nervure rather short and nearly coincident with the basal portion of the anterior margin; with the subcostal simple from the base to the apical third of the wing, where it delivers to the costa two or three very short marginal nervules (except in *Tischeria*;) with the discoidal cell usually acute behind, with one or two branches to the tip of the wing: with the median simple nearly to the tip, and dividing into two approximated nervules, with the submedian simple. The posterior wings linear-lanceolate, with a very short costal nervure at the base; with the subcostal nervure simple; with the median nervure simple and both rather faintly indicated.

TABLE OF GENERA.

Head with a tuft above.

Tuft abundant and *hairy*.

Antennæ simple.

Lithocolletis.—Anterior wings with *two* subcosto-marginal veins and one from the apex of the discoidal cell.

Tuft little exceeding the front, *scaly*.

Antennæ ciliated in the ♂.

Tischeria.—Anterior wings with *four* subcosto-marginal veins, the first from near the basal third; discoidal cell not pointed and *two distinct* discal nervules.

Tuft scanty, not overarching the vertex.

Leucanthiza.*—Anterior wings with *three* subcosto-marginal veins; discoidal cell acute, with *two distinct* veins from the apex.

Head smooth.

Phyllocnistis.—Anterior wings with *three* subcosto-marginal veins; discoidal cell pointed with a single vein from the apex, furcate near the tip.

LITHOCOLLETIS Zeller.

Head roughened with an abundant tuft of hairs overarching the vertex. Front smooth, broad and retreating or much retreating. Ocelli none. Eyes scarcely visible and partially covered with scales. Antennæ simple, hardly shorter than the anterior wings, with the basal joint moderately thickened, but not expanded into an eye-cap. Maxillary palpi none. Labial palpi filiform and drooping, (in the living insect ascending.) Tongue naked, about as long as the anterior coxæ.

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* This genus and the one preceding it, belong to the family Lyonetidæ in the system of European writers. The close relationship indicated in the structure of the perfect insects, and the general harmony of their histories, do not, however, in my own view, authorize the separation of the genera here described, into distinct families.

The anterior wings are pointed (from the outline of the cilia appearing to be elliptical,) the posterior lanceolate. In the anterior wings the discoidal cell is *acute behind;* the subcostal nervure sends two short branches to the costa, and from the apex of the discoidal cell a single vein to the tip. The median nervure sends two veins to the inner margin near the tip. In *Desmodiella* there is but *one* subcosto-marginal vein. In the posterior wings both the subcostal and median nervures are simple.

There are two larval forms in this genus. In the first, the head is much longer than broad, *acutely ellipsoidal*, with the sides rather thick and rounded; the body is cylindrical, submoniliform and the thoracic rings somewhat swollen. In the second, the head is thin and flattened, with the mandibles forming an appendage in front; the body flattened, deeply incised and mammillated on the sides. In both groups there are *three* pairs of thoracic feet, *three* of abdominal and a terminal pair, but shorter in the second than the first.

The larvæ mine the upper and under side of leaves, the larvæ of the first group usually throwing the leaf into a fold and feeding from the margins of the mine to the center; those of the second forming a flat mine, sometimes a rather broad linear tract and sometimes an irregular blotch, their mandibles being capable of working only in a horizontal direction. They change into pupa within the mine, some weaving a firm cocoon, some suspended in a web, and some forming a cocoon of grains of excrement and silk, or constructing the outline of the cocoon with them. The cocoons of the second group are shown on the separated epidermis as a circle and an almost hemispherical protuberance on the under surface.

The perfect insects rest with the antennæ thrown backward beneath the wings, some with the head slightly elevated, others with the head applied to the surface and the body behind elevated. I think the majority of the species here described assume the latter position, with variations in the angle formed with the surface on which they rest.

Table of Species.

I.—With an apical spot.

Without a basal streak.

Fore wings golden above the fold.

2. Robiniella, dark cinereous beneath the fold, sometimes rather silvery.

Fore wings pale reddish-saffron, with golden hue.

4. Æriferella, with the first dorsal streak black-margined internally and at tip behind.

Fore wings deep reddish-orange.

10. Obstrictella, with three silvery bands; apical spot with one or two silvery scales.

With a basal streak.

Fore wings silvery.

Basal streak black.

6. Argentifimbriella, with the streaks decidedly dark-margined; golden towards the tip.

Basal streak golden.

1. Lucidicostella, with the streaks not decidedly margined; suffused with golden.

Fore wings pale golden.

Silvery basal streak black-margined.

7. Obscuricostella, with inner margin at base of the general hue.

Silvery basal streak unmargined.

8. Ostryæfoliella, with inner margin at base with a white streak.

II.—With an apical spot.

Apex concolorous and not dusted.

With a basal streak.

Fore wings shining ochreous-saffron.

5. Basistrigella, with first costal and dorsal streaks unmargined.

With no basal streak.

Fore wings ferruginous brown.

3. Desmodiella, ruby tinted at base, with two silvery bands.

Fore wings silvery.

9. Lucetiella, golden toward tip, with a black costal spot and opposite black line.

ǂǂ *An oblique costo-apical white streak or spot.*

Apex not dusted with dark scales.

Fore wings reddish-orange.

12. Aceriella, with a short dorsal streak near the base, two silvery bands, an oblique dorsal streak near the tip, and a costal spot above it.

Apex dusted with dark scales.

12. Var. Aceriella?

ǂǂǂ *With dispersed, dark, apical scales.*

Fore wings reddish-orange.

With three silvery bands.

11. Caryæfoliella, black margin of the second band produced, apical scales on a white ground.

With two silvery bands.

13. Guttifinitella, black margin of second band not produced; a costal and dorsal spot near the tip,

Fore wings white.

15. Hamadryadella; branded with shining ochreous-saffron; irrorated with black.

With a basal streak.

5. Basistrigella, (sometimes,) with *four* costal and *three* dorsal slender streaks.

16. Argentinotella, with *five* costal and *four* dorsal conspicuous streaks.

ǂǂǂǂ *With a median, black, apical streak.*

Fore wings dark brownish-golden.

14. Cratægella, with a silvery basal streak, black-margined above.

1. L. lucidicostella.—Antennæ white. Head and tuft silvery-white. Fore wings, basal portion silvery white to the middle, *with a discal pale golden streak* from the base, retreating from the costa before reaching the middle of the wing, and somewhat suffused with golden beneath the fold. From the middle to the tip, pale golden, with four costal silvery streaks, dark-margined internally, and two dorsal silvery streaks, the first opposite the second costal streak, and both dark-margined internally; *the first costal streak not decidedly dark-margined.* Apical spot, black. Hinder marginal line in the cilia, dark brown; cilia pale gray. Hind wings shining bluish gray; cilia gray.

The larva mines the under side of the maple leaf, Acer saccharinum, in July, Sept., and Oct. The head is pale brown; body pale green, colored darker by the ingesta. "Frass" collected into a ball within the mine. The pupa is suspended in a web of silk within the mine.

2. L. Robiniella.—Antennæ dark brown. Front silvery white, tuft dark brown mixed with grayish. Thorax dark brown. Fore wings golden yellow above the fold, and dark cinereous somewhat dusted with blackish beneath it. About the middle of the wing is an oblique, silvery costal streak, black-margined on both sides, extending to the fold; another beyond the middle, meeting nearly in the center of the wing at an angle, a dorsal streak from the inner margin, the former black-margined on both sides, the latter internally; another costal streak near the tip with an internal circular black margin, opposite to

a dorsal streak of the same hue and joined or nearly joined to it. Just behind the apical spot is a straight silvery streak, black-margined internally. Between the first and second dorsal streaks, is a short black streak in the fold. Apical spot, black and round, with a hinder marginal blackish line in the cilia; cilia grayish. Hind wings, shining dark gray, cilia the same.

The larva mines the underside of the locust leaf (Robinia pseud-acacia) the separated epidermis of which is conspicuously white. It may be found in the latter part of September and the beginning of October. The pupa is contained in a white silken cocoon within the mine. The imago appears in the latter part of October, and early in November. I have not found a spring or summer brood in the leaf of the locust. The larva is cylindrical; the head pale brown; the body pale greenish white, with a red vascular line from the 5th to the 9th segment; on the 9th segment are two irregular patches, chrome yellow; sometimes these patches are wanting.

The under side of the leaf of Amphicarpæa monoica is also mined by a larva, which I believe is the same as that in the leaf of the locust. It may be found in the beginning of September, the imago in October. The imago differs very slightly from Robiniella, and I have no note of any difference in the larval state, and like Robiniella it weaves a white silken cocoon within its mine. The perfect insect differs from the foregoing species in the following respects: the wing *beneath* the fold is blackish at the base, with a silvery dorsal spot rather nearer the base than the first costal spot and exterior to the dark-margin, it is silvery, dusted with blackish; the *second* costal spot is not as distinctly angled in the middle and the apical spot is larger; in some specimens there are two dorsal white lines on the thorax. The general resemblance between the two is so marked that I consider it unnecessary to designate it as a variety, for it is undoubtedly, I think, the same insect.

With a single subcosto-marginal nervule.

3. L. Desmodiella.—Antennæ dark brown, tipped with a silvery hue Front whitish, with a ruby-colored lustre; frontal tuft dark brown. Thorax with a splendent ruby hue. Fore wings ferruginous brown, ruby-tinted at the base, with two silvery bands dark-margined on both sides, one near the base and one in the middle of the wing. A costal and dorsal silvery spot near the tip, opposite to each other, and a costal silvery spot just before the tip, the two former dark-margined on both sides, and the latter slightly dark-margined. No hinder marginal line; the cilia opposite the last dorsal spot blackish, and the wing beneath the last costal spot golden-brown. Hind wings pale brownish gray, cilia the same.

The larva may be found in the leaf of Desmodium viridiflorum in July and early in August; it mines the under surface, usually near the margin, which is more or less folded, and the separated epidermis brown and hairy. I have no description of the larva. It becomes a pupa during the latter part of August, and is suspended within the mine in a very slight web of silk. The perfect insect is the smallest of this group that has come under my observation.

4. L. Æriferella.—Antennæ dark brown above, white beneath. Front silvery white; tuft dark brown. Fore wings pale reddish-saffron with a golden hue, especially from the middle to the base, with four silvery costal streaks, the first on the middle of the costa, and all except the last black-margined toward the base, the third but faintly, and the costa black from the base to the first costal streak. Three silvery dorsal streaks on the inner margin, the first two large and the third small, the first black-margined internally and around the tip behind, the second by a line curved above. Apical spot small and black, with the scales behind it having a bluish splendent lustre; hinder marginal line blackish; cilia dark grayish, with a fulvous hue. Hind wings dark gray, cilia fulvous.

The larva may be found in the leaves of oaks in September and early in Octo-

ber. It makes a small mine on the under surface, and the leaf is thrown into a fold previously to pupation and the cuticles folded and corrugated. The pupa is contained in an ovoid cocoon within the mine, composed of "frass" and silk. The imago appears in May. The body of the larva is cylindrical. The head is pale brown; the body yellow, with a broad, vascular, reddish brown band. There is doubtless a spring brood, but I have not searched for the larva during the season.

5. L. basistrigella.—Antennæ silvery. Front silvery, tuft fulvous mixed with silvery. Thorax pale, reddish golden, with a white streak on each side and one in the middle. Fore wings shining ochreous saffron, with a slender, unmargined white basal streak in the fold, a white basal streak along the costa, narrowly dark margined on the extreme costa, extended to the first costal streak, which is silvery white, very oblique and unmargined; behind this are three small costal streaks of the same hue, the two central dark-margined internally. Opposite the first costal streak is a long, very oblique, silvery white dorsal streak, extended along the inner margin to the base, with dark brown scales between their hinder ends, or exterior to the tip of the dorsal streak, but sometimes absent. Nearly opposite the third costal streak is a dorsal silvery streak dark-margined internally. No apical spot, sometimes with dispersed dark brown scales beneath the last costal spot. The hinder marginal line blackish; cilia pale fulvous. Posterior wings gray, cilia gray with a fulvous hue.

The larva mines the under side of the leaves of oaks; I have usually found it in the leaf of the chestnut oak, in September. The mine is limited by two veins of the leaf, and when completed the external epidermis is left transparent. The "frass" is cast on the margins of the mine, and when the larva is prepared to enter the pupa state it collects the grains of "frass" and makes an oval outline of them within the mine, or wall to its cocoon, leaving the cuticles transparent, so that the pupa can be seen within. The imago appears early in May. The body of the larva is cylindrical. It is lemon-yellow along the dorsum, except the three anterior wings, which are whitish, with a series of dark brownish dorsal dashes beginning on the third ring; on the eighth ring, in some specimens, is a dorsal reddish orange patch. Head whitish, tinged with pale brown.

6. L. argentifimbriella.—Antennæ silvery, annulated with darkish brown. Head, front and thorax silvery white. Anterior wings silvery, pale golden from nearly the middle to the tip, with a long basal dark brown streak margined above with golden, extending nearly to the first costal streak. There are four silvery costal streaks all dark-margined, the first very oblique, the second convex toward the base of the wing. The first costal dark margin is decided and extended on the costa toward the base. Two silvery dark-margined dorsal streaks, the first opposite the second costal streak. The apical spot black; hinder-marginal line dark brown, cilia silver gray. Hind wings silver gray, cilia the same.

Found in the pupa state in the same leaf as the foregoing in the latter part of September. The pupa is suspended within the mine in a very thin silken web. The perfect insect appears early in May.

7. L. obscuricostella.—Head and frontal tuft silvery. Thorax very pale golden. Fore wings pale golden, with a silvery median stripe from the base, *black-margined toward the costa*, extending to the middle of the wing; with four silvery costal streaks, the first very oblique and rather long, and all except the last black-margined internally, the margin of the first being long and the continuation of a black streak from the base along the extreme costa. Three silvery dorsal streaks, the first quite long, obliquely curved and opposite the first costal streak, and the first two black-margined internally; *the second dorsal obliquely opposite the third costal streak.* Apical spot black; hinder-marginal line black, cilia grayish. Hind wings bluish gray, cilia the same. *Abdomen black, tipped freely with yellow.*

The larva mines the leaf of Ostrya Virginica (hop-hornbeam) in September. I have no description of the larva, supposing at the time of capture it was the same as the succeeding species. The pupa was not contained in an ovoid cocoon made of "frass" and silk. The imago appears in May.

8. L. Ostryæfoliella.—Antennæ silvery. Front silvery, tuft fuscous and silvery mixed. Thorax silvery, with the basal part of tegulæ pale golden. Fore wings pale golden, with *an unmargined, median, silvery basal stripe, and a silvery streak along the basal portion of the inner margin.* Fore wings pale golden, with four silvery costal streaks, all except the last black-margined internally; with two dorsal streaks of the same hue, black-margined internally. The first costal and first dorsal streaks opposite, quite oblique and broad at their bases, *the second dorsal opposite the second costal streak.* The basal streak is moderately broad, and extends quite to the middle of the wing. Apical spot black; hinder-marginal line blackish; cilia fulvous gray. Hind wings gray, cilia fulvous gray. *Abdomen pale fulvous.*

The larva mines the under side of the leaves of Ostrya, and may be found early in July and October. The mine is usually near the margin of the leaf, is flat at first, but is gradually thrown into a fold, the separated epidermis corrugated. When completed, the epidermis has changed to a pale brown color. The larva undergoes its transformation in a cocoon composed of "frass" and silk, in the form of a small ovoid ball suspended within the mine. The larva is cylindrical, with the body pale yellow, colored on the dorsum beyond the third segment, dark green from ingesta. The imago appears in August and May.

In the same leaf, mining the upper surface in a blotch mine, at first white and subsequently brown, may be found in October a Lithocolletis larva of a different type from the above. It tapers posteriorly, is flattened above and beneath, with the rings distinctly separated and mammillated at the sides; the first ring is rather abrupt anteriorly and much broader than the head. The head is somewhat triangular, flattened and thin, with the mandibles projecting in front as two small, rounded appendages. The head is pale brown, the body of the same hue, with dorsal, dark brown, elliptical maculæ, placed transversely on the segments. I have not seen the imago, and refrain from naming the species, lest it may be identical with some one hereafater described. The cocoon is *circular*, its outline being visible on the upper epidermis as a circle, while beneath it is raised and prominent.

9. L. lucetiella.—Antennæ silvery. Head, tuft and thorax silvery. Anterior wings silvery from the base to the middle, and thence to the tip golden, with a golden costal streak from the base not extended to the middle. About the middle of the wing is a silvery band, broadly margined internally with golden, and with a *minute black point* on the costa internally; a costal silvery spot, margined internally by a *black spot*, nearly opposite to which is a large dorsal silvery streak margined internally by an *oblique black line;* near the tip is a costal, silvery, unmargined streak curving to the tip; cilia golden, at the tip and on inner margin silvery. No apical spot nor hinder-marginal line. Hind wings silver gray, cilia the same. Abdomen blackish, tipped with silvery gray.

The larva mines the under side of the leaf of Tilia Americana (bass wood) in July, September and October. The mine is most frequently nearly square in form, and when completed both cuticles of the leaf are left nearly transparent, and the leaf is not folded. The "frass" is cast on the edges of the mine. It weaves an oval cocoon, thin enough, however, to permit the pupa to be seen through the cuticles. The larva is cylindrical. The head pale brown; the body pale greenish white, with a series of dorsal brown spots from the third ring posteriorly. The imago appears in August and May.

10. L. obstrictella.—Antennæ silvery beneath, blackish above, with

a whitish band near the tip. Front silvery, with a reddish tinge on the forehead. Tuft and thorax reddish orange. Fore wings deep reddish orange, with three silvery bands black-margined exteriorly, one beyond the middle toward the base, one about the middle and one near the tip. A large black apical spot, with a few silvery scales or minute spots; hinder-marginal line dark brown, cilia reddish orange. Hind wings blackish, cilia blackish brown. Abdomen black.

The larva mines the under surface of oak leaves, in September. I did not open the mines of the specimens I secured as I had but two. The larva was cylindrical, and through the unruptured cuticle appeared to be of a lemon yellow color. The pupa was contained in a very slight web within the mine. The imago appeared in May. The larvæ which I secured were taken in the leaves of the *black oak* on September 23d.

11. L. Caryæfoliella.—Antennæ silvery, annulated with blackish. Front silvery. Tuft and thorax reddish orange. Fore wings reddish orange, with three silvery bands, black-margined exteriorly, the second about the middle of the wing, angulated, with the black margin broad and produced posteriorly on a whitish ground, nearly to the third, which is somewhat interrupted in the middle; the first midway between the second and base of the wing and also angulated near the costa. The apical portion of the wing white, covered with dispersed black scales, with a few black scales on a whitish ground, on the costa, between the last silvery band the dusted apical portion; with two hinder-marginal lines, one the margin of the apical scales, the other a dark brownish line in the cilia. Hind wings pale brownish gray, cilia gray, with a fulvous hue.

The larva mines the upper side of the leaves of the hickory tree in June, July and September, making a white blotch, or an irregular, rather broad tract when there is but one in the leaf; and not throwing the leaf into a fold. Frequently there are several larvæ in a leaf, in one instance I counted twelve. The "frass" is deposited along the middle of the mine. The larva is flattened, and its physical characteristics are similar to those of the second larval group. The head is very light brown; the body dark lead color, becoming yellowish posteriorly, with the mammillæ of the thoracic rings yellowish, and a central spot of the same hue on the first; each ring on the dorsum with a dark brown, shining macula, those on thoracic rings trapezoidal, the remainder oval; on the ventral surface the maculæ are also dark brown, those on the fourth and fifth rings being oval. The perfect insects of the spring brood appear in August; from the fall brood I did not succeed in rearing the imago.

12. L. aceriella.—Front silvery, tuft reddish orange and silvery mixed. Thorax reddish orange. Fore wings reddish orange, somewhat metallic, with a white streak black-margined exteriorly, *from the inner basal angle to the fold;* with two oblique, silvery bands black-margined behind, one about the middle of the wing and the other midway between it and the base of the wing. Near the tip is a costal silvery spot, black-margined behind, with an opposite, oblique, dorsal streak of the same hue, likewise black-margined behind, and an oblique, costal, silvery streak continued on the line of the last dorsal, running into the cilia just before the tip, black-margined *above*, at the tip before, and *below* at the tip behind; scarcely with a hinder-marginal line, cilia of the general hue. Hind wings plumbeous, cilia with a fulvous hue.

The larva mines the leaf of maple in September. It mines the upper surface of the leaf, making a flat, rather broad tract, casting its "frass" along the middle of the course of it. Physical characteristics those of the second larval group. Head pale brown; body yellowish green, with oval, dorsal, brown maculæ, darkest on their margins; thoracic rings on their sides pale yellowish. The cocoon is circular. The larva is likewise found in the leaf of Hamamelis Virginica (witch-hazel).

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I have two or three other specimens which appear to unite the specific characters of the present and succeeding species, and I therefore decline to describe them until I have conducted more careful observations on their embryonic histories than I have instituted at present.

13. L. guttifinitella.—Front silvery, with a reddish hue. Tuft and thorax reddish orange. Antennæ blackish brown. Fore wings rather deep reddish orange, with two silvery bands black-margined behind, one in the middle of the wing and nearly straight, the other midway between this and the base of the wing and obliquely placed. Before the costo-apical cilia is a costal, silvery spot, black-margined on both sides, with an opposite dorsal spot, black-margined behind. The apical portion of the wing is dusted with blackish, dispersed scales with a white spot near the tip above the middle of the wing. There are two hinder-marginal lines, one the margin of the dispersed scales, the other dark brownish in the cilia.

The larva may be taken in August and September in the leaf of Rhus toxicodendron (Poison Oak) mining the upper surface in a rather broad, tortuous tract, and there are ordinarily several in the same leaf. The larva belongs to the second larval group. The head is a fine pale brown; the body yellowish posteriorly, becoming brownish above, with dorsal and ventral dark brown maculæ. The cocoon is circular, formed within the mine as usual in this group in a little circular depression.

It is probably unnecessary to caution the collector to be careful in handling the leaves of the food-plant of this larva; to many persons they are poisonous, producing a very disagreeable and uncomfortable eruption. I was affected by it when I first collected this species, and would advise all others to handle the food-plant "with gloves."

14. L. cratægella.—Antennæ, front and tuft dark silvery gray. Fore wings rather deep brownish golden, with a broad silvery basal streak, black-margined toward the costa, extended to the tegulæ in front and pointed behind, with the point black-margined on both sides and with the costa black. Four costal silvery streaks, the first oblique but rounded beneath and black-margined on both sides, the others toward the base alone. Three silvery dorsal streaks, the first rather broad, oblique, nearly touching the first costal, and black-margined on both sides as also the second; the third only toward the base. A streak of black scales in the middle of the wing at the apex, extended backwards between the streaks to the second dorsal and costal. Hinder-marginal line blackish, with a violet metallic hue; cilia dark fulvous.

The larva mines the underside of black thorn during September and October. The mine is usually limited by two veins of the leaf. The larva is cylindrical, with a very pale brown head; the body yellowish, colored dark green by the ingesta. The imago appears in April and May.

15. L. hamadryadella.—Front, tuft and thorax white. Antennæ white, annulated above with blackish. Fore wings white, with an angulated, shining, ochreous saffron band, rather behind the basal third of the wing, black-margined internally with dispersed scales; a broad angulated band of the same hue, behind the middle, black-margined internally with dispersed black scales, produced in the middle, so as to divide it into two portions, with the space between the bands somewhat suffused behind the second with ochreous saffron, and an irregular line of blackish dispersed scales through the middle of it. Near the tip is a costal and dorsal ochreous saffron spot, with the white space between these and the second band dusted with blackish, with the apical portion white, dusted with black scales, and connected with the patch before it by a line separating the costal and dorsal spots. The basal portion of the wing somewhat dusted with black, with a small blackish patch on costa near the base and two small, faint saffron patches beyond it. The hinder-marginal line blackish, cilia with a fulvous hue. Hind wings rather dark silvery gray, cilia with a fulvous hue.

Variation F.

The first ochreous saffron band interrupted in the middle, with a broad internal margin of scattered scales, produced behind in the middle; the second somewhat diffuse, with the irrorated portion of the wing spreading out behind from the produced part of its black-margin.

Variation G.

With an angulated line of blackish scales before the first band and an ochreous saffron patch between its angle and that of the black-margin of the first band.

The larva mines the upper-side of the leaves of oaks in July. The head is black, the body pale yellowish, with an ochre yellow patch on the dorsum of the eighth segment, a dark vascular line and a few dark subdorsal spots posteriorly. The imago appears early in August. The variations F and G were specimens found in the pupa state.

16. L. argentinotella.—Antennæ silvery. Front and tuft silvery. Thorax pale reddish saffron, with a rather short, unmarginal, silvery basal streak, with *five* costal silvery streaks and *four* dorsal streaks of the same hue. The first costal and dorsal streaks unmargined, the first dorsal being near the inner angle of the base, tapering to a point in the middle of the wing from a very broad base; the first costal streak rather slender and only one-half as long as the first dorsal; the second costal and second dorsal connected about the middle of the wing, and dark-margined toward the base by a line much curved in the middle; the third costal and third dorsal opposite, and each dark-margined internally; the fourth dorsal about midway between the fourth and fifth costal streaks; sometimes the fourth costal and dorsal streaks with a few dark internal scales, sometimes unmargined. At the apex is a small patch of scattered black scales; the hinder-marginal line rather indistinct, cilia saffron, paler on inner margin. Hind wings shining silver gray, cilia rather darker.

I am unable to give any account of this species. The specimens were unmarked by any number referring to my notes, and I suppose I must have mistaken it for some other, as I did not observe its peculiar markings until I came to write the present paper. I hope, however, to supply its larval history next season, now that the species thus far met with are tabulated in a manner which will facilitate recognition.

The following genus belongs, in the arrangement of European systematists, to the family Elachistidæ. I do not think any argument necessary to prove that it is a natural portion of Lithocolletidæ, which is usually regarded as being composed of a single genus.

Tischeria Zeller.

Head with a rather erect frontal tuft of scales; the front smooth, narrow and but little inclined. Ocelli none. Eyes rather salient, *naked* and not covered with scales in front. Antennæ scarcely more than one-half so long as the anterior wing, with *rather long pilose ciliations* beneath in the ♂, simple in the ♀, with the basal joint tufted in front. Maxillary palpi *very short and scarcely perceptible*. Labial palpi short, filiform and drooping. Tongue scaled, as long as the anterior coxæ.

The wings with long cilia; the anterior pointed almost caudate, the posterior lanceolate. The discoidal cell of the anterior not pointed, closed in front by *a very faint nervure*, and with *a faintly indicated secondary cell*, beyond which the subcostal nervure is almost obsolete. The subcostal nervure sends *four veins* to the costa, the first of which is rather long and arises near the basal third of the wing; the discal emits a simple vein to the costa above the tip and one to the inner margin beneath. The median nervure send two veins to the inner margin near the tip. The submedian is simple.

The head of the larva is circular in outline, thin, flat and nearly as broad as the first ring. The body tapers much posteriorly, is subcylindrical and moniliform, with the anterior rings slightly dilated, with the segments rounded and distinct at the sides; with three thoracic feet, four abdominal and one terminal pair, all of which are extremely short and are scarcely more than cup-like depressions.

The mine is usually made, if not always, near the margin of the leaf which, in this case is folded and curled so as almost to conceal the separated epidermis when completed, although in the beginning it is nearly flat. It contains no "frass," and an examination of the under surface reveals the presence of minute, round holes, through which the larva ejects its excrement. The pupa is contained within the mine, generally not in a cocoon, but the mine is carpeted throughout with silk, thus closing up the holes in the lower surface. The pupa case is thrust from the mine at maturity.

The imago reposes with its head elevated and the tips of the wings touching the surface on which it rests. The antennæ are thrown back beneath the wings, the anterior legs folded on the breast, the insect sustaining itself by means of the middle and posterior legs.

Table of Species.

Fore wings with isolated black atoms.
Solidagonifoliella; yellowish, slightly tinted with fuscous.
Fore wings immaculate.
Hind wings concolorous.
Zelleriella, yellowish, with reddish saffron at the tip.
Female ? the entire insect reddish ferruginous.
Hind wings with a fuscous patch near the base.
Citrinipennella, bright yellow, reddish ferruginous at tip.

T. solidagonifoliella.—Head, thorax and antennæ pale yellowish. Fore wings yellowish, somewhat tinted with fuscous, with a short line of black atoms along the middle of the inner margin, two small patches or much scattered, isolated black atoms toward the base of the wing, a patch near the tip on the inner margin, with a minute patch or a few isolated atoms on the costa between the line and patch on inner margin; at the tip are a few isolated atoms. Hind wings very pale yellowish, cilia the same. The male described.

Found in the pupa state August 1st in the leaf of a species of Solidago. The mine was on the upper surface and the leaf not folded. The pupa was contained in a *slight circular cocoon*, attached to the upper cuticle, which formed its upper walls. On August 9th the imago appeared, the pupa case having been thrust through the *under side* of the leaf.

T. Zelleriella.—Antennæ, head and thorax pale yellow. Fore wings yellowish, with reddish saffron along the middle and toward the tip; cilia reddish saffron, pale yellow on the inner margin. Hind wings bluish gray, *tinted with yellow externally toward the tip*, cilia yellow on the exterior margin toward the tip, internally pale yellowish gray.

Female ? The head, thorax and fore wings yellowish, suffused with reddish ferruginous, darkest toward the tip. Hind wings dark gray.

The larva mines the leaves of oaks in September, making at first a white blotch on the upper surface, but subsequently the upper epidermis becomes brown and the margin of the leaf curled. The head is dark brown; the body yellowish, with the dorsum of the first segment blackish, with two lateral minute pale spots; a vascular dark green line. The imago appears early in May, and there is, therefore, a spring brood.

T. citrinipennella.—Antennæ pale fuscous; head and thorax yellowish, tinted with reddish saffron. Fore wings bright yellow from the base

nearly to the tip; apical portion reddish ferruginous. Hind wings dark gray, with a fuscous patch near the base; cilia pale fuscous. The male described.

There is but little difference between this and the foregoing species, either in the perfect or larval state. The larva mines the upper surface of oak leaves, in September. The head is dark brown; the body yellowish green, with a a double dark brown macula on the dorsum of the first ring; vascular line very narrow and dark green. A more careful observation than I have given these insects may prove them to be the same, or the latter a variation. I have but a few of each of them. The imago appears early in May, and a spring brood will be found in early summer.

PHYLLOCNISTIS Zeller.

Head smooth, elongated above and clothed with imbricated scales. Front with scales closely appressed, slightly retreating and broad at the clipeus. Forehead or vertex, globosely rounded. Ocelli none. Eyes scarcely visible in front and partially covered with scales. Antennæ simple, *one-third* less long than the anterior wings; basal joint scarcely with an eye-cap, somewhat enlarged and flattened, but smooth and squamose. Maxillary palpi none. Labial palpi very slender, and drooping (in the living insect they are ascending). Tongue very slender, *naked* and scarcely as long as the anterior coxæ.

The anterior wings almost caudate, the posterior lanceolate. In the anterior wings the discoidal cell is *acute behind;* the subcostal nervure sends three short branches to the costa, and from the apex of the discoidal cell arises a branch *furcate* behind the tip, one of the nervulets proceeding to the costa before the tip, the other to the inner margin. The median nervure sends two approximated veins to the inner margin near the tip. In the posterior wings the subdorsal is simple, ending in the tip, the median furcate near its marginal extremity.

The head of the larva is thin, flat and circular, with the mandibles forming an appendage in front on the median line similiar to some of the lithocolletes larvæ. The body tapers somewhat posteriorly with the sides of the segments slightly projecting and flattened, with the general form rather cylindrical. It is without feet or prolegs, and is very inactive, making little or no voluntary movement when removed from the mine, and does not retreat in its mine when touched. The body is somewhat viscid.

The mine is a linear tract just wide enough to accommodate the body, long and winding. The larva does not consume all the parenchyma of the leaf along its tract, but simply separates the upper epidermis, so that it is not transparent. When full grown the end of the mine is enlarged and the cocoon woven in a little pucker of the leaf within the mine.

The perfect insect is very sluggish, at rest carrying its antennæ thrown backward, but arched somewhat above the dorsal surface.

P. vitegenella.—Antennæ brownish silvery, fuscous at the tip. Head and thorax silvery white. Fore wings silvery white, slightly golden toward the tip, with a blackish dorsal patch on the inner margin near the base. Somewhat behind the middle of the wing is a black oblique costal streak and a black line curving from the costa to the inner margin. At the tip is a circular black spot, and before it on the costa two short, straight, black streaks. At the extreme tip of the wing are two blackish, diverging streaks in the cilia, with one of the same hue in the cilia beneath the apical spot nearly joining a black hinder-marginal line; cilia silvery. Hind wings silvery, cilia the same.

The larva mines the upper side of the leaf of Vitis cordifolia and perhaps other species, in September and October. The imago appears in September.

LEUCANTHIZA.

Head slightly hairy above on the vertex. The front smooth, covered with closely appressed scales, broad, even beneath and somewhat inclined. The

forehead or vertex rather acutely rounded above or ridge-like. Ocelli none. The eyes scarcely visible in front, partially concealed by scales. Antennæ simple, nearly or quite as long as the anterior wings, the basal joint squamose and but little larger than the stalk. Maxillary palpi none. Labial palpi very slender and drooping. Tongue naked, as long as anterior coxæ.

The fore wings are almost caudate at the tip; the posterior lanceolate. The discoidal cell of the fore wings is *acute behind*, with *two veins* emitted at its point, one to the costa before the tip the other to the inner margin. The subcostal nervure sends three short veins to the costa and the median two approximated veins to the inner margin. In the hind wings the subcostal and median are both simple, and the *latter* extended to the tip.

The head of the larva is very thin and flat, with projecting mandibles in front. The body is much flattened, tapering anteriorly and posteriorly, the rings separated by rather deep incisions and their ends on the sides mammillated; the rings themselves being rather elongated ellipsoids. The thoracic feet are *three* and mere mammillæ; the abdominal three, but their appearance not very distinct, and a terminal pair. The larva approaches that of the second group of Lithocolletis very closely.

The mine is a conspicuous white blotch on the upper surface, generally occupying the greater portion of the leaf, and sometimes when two are present in the same leaf, the whole of it. A day or two previously to undergoing their last molting, the larvæ cease to eat, and at the end of that time leaving its "cast" within the mine abandons it to construct a white silken cocoon, which is woven on some substance on the surface of the ground.

The perfect insect holds the antennæ extended at the sides when at rest, and moves them with a rotatory motion during progression.

L. amphicarpeæfoliella.—Head golden, with fuliginous hairs above. Antennæ golden brown, with the tips silvery white. Thorax golden, fuliginous in front, and abdomen golden brown. Fore wings deep orange yellow, with the apical portion dark golden brown and a fuliginous or deep brown patch occupying the basal part of the wing, bordered broadly behind by a circular golden streak, extending from the costa to the inner border at the basal angle. A very oblique somewhat curved golden streak, dark-margined on both sides, extends from the basal third of the wing near the costa, to the middle of the costa. A large golden patch, dark-margined above, extends from the inner angle to the middle of the wing, with the inner margin between it and the circular basal streak dark golden brown. At the beginning of the costal cilia is a golden dorsal streak; cilia dark brown, in certain lights golden brown. Hind wing dark gray, cilia the same.

The larva makes a conspicuous white blotch mine on the upper surface of the leaf of *Amphicarpæa monoica* (hog pea-nut) from August to October. The head is pale brown; the body pale green, with brownish maculæ along the dorsum, and round dark brown spots on the ventral surface; the ends of the first ring on the sides are yellowish. After the last molting the body is uniform dark green, the "cast" with dorsal maculæ being left within the mine. The imago appears about the middle of May. This insect is one of the most beautiful I have met with.

Note. The reader is requested to make the following corrections in the paper contained in the September number of the Proceedings.

Page 257, line 9 from the top, after "*two*," insert *or three*.

Page 260, instead of *A. effrentella* read *A. effrenatella*, and also in the explanation of the plate p. 262.

[1858.]

December 6th.

Mr. Lea, President in the Chair.

Thirty-nine members present.

Dr. Fisher presented for publication an index of the genera described or referred to in the Proceedings of the Academy, vol. i.—viii., which was referred to the Committee on Proceedings, with power to act.

A paper was presented for publication in the Proceedings, entitled, "Descriptions of Three New Species of Exotic Uniones, by Isaac Lea," and was referred to a committee.

Mr. Lea exhibited a specimen of *Unio subrotundus*, Lea, from White River, Indiana, and observed that he had in May, 1856, called the attention of the members to a female specimen of *Unio multiplicatus*, Lea, which had *both lobes* of the branchiæ on *both sides* charged with embryonic shells. In the following June, he exhibited a fine female, *U. rubiginosus*, Lea, also with the *four lobes* charged. This species differed from the former in having *red ova*, which were quite intense in color, resembling arterial blood. In July, 1859, he called attention to a third species, *U. Kleinianus*, Lea, from Georgia, which had "a *branchial uterus in both lobes of the branchia on each side.*" These specimens were in alcohol, and if the *ova* were red when living, it was not observable in those. The specimens of *subrotundus* now exhibited, prove this species to be possessed of *branchial uteri* in the *four lobes* of the branchiæ, and, also, that the *ova are red*, like *rubiginosus*. Therefore, we now know of four species which have this remarkable provision of a branchial uterus in each lobe or leaf of the branchia, viz:

Unio multiplicatus,
Unio rubiginosus,
Unio Kleinianus,
Unio subrotundus,

and of these, two at least have the very remarkable condition of redness of the ova, viz.:

Unio rubiginosus,
Unio subrotundus.

It is a fact not less interesting, that the spermatic fluid of the male was found on the glandular flattened lobules, also to be *red*, but the color did not appear to be so intense as that in the ova of the female. Whether the males of other species, the females of which have *red ova*, will be found to have *red spermatic fluid*, remains for future investigation and observation.

That other species will be found to have *uteri* in the four lobes of the branchia he had little doubt, and that *red ova* would be found to characterise other species is also probable. The coördination of the four species, as regards their four branchial uteri, is very remarkable, and it is the more striking, as they appear from their shelly covering—their exo-skeleton—to belong to groups very different in the structure of this part. The *U. multiplicatus*, and *U. Kleinianus*, are both plicate; the former is the largest of the genus *Unio* known, and the latter is among the smallest. The *U. rubiginosus* and *U. subrotundus* are smooth, without any appearance of folds, and in their outline are different from the two former, and they also differ much, one from the other. In the four species there is such a marked difference in the shelly covering, as to cause the species to be recognized at once as to their distinct normal forms.

It has always been a difficulty, in the examination of alcoholic specimens, to make exact and satisfactory differences in some of the soft parts, and these may often be erroneously described where color or delicate organs and processes are involved in the discussion of their characteristics. These difficulties can only be avoided where the specimens can be examined in a living state, where all

the parts are in a normal condition. It is, therefore, greatly to be desired that zoologists in our different zoological districts would give attention to the anatomical structure of the species which inhabit their own districts. Eventually, in this way, there may be built up a correct knowledge of the habits and anatomy of this interesting family, of which we have a somewhat comparatively correct diagnosis of the exo-skeleton.

Mr. Lea also mentioned that, in connexion with this subject, he had paid much attention to the power of vision in the family *Unionidæ*, since his communication on the subject, in February, 1857. He found the following species always to close the anal opening, and to withdraw the papillæ of the branchial opening when the light was suddenly intercepted, viz:

Unio cylindricus, Say.
Unio rubiginosus, Lea.
Unio subrotundus, Lea.
Unio pyramidatus, Lea.
Unio obscurus, Lea.
Unio pustulosus, Lea.
Unio Æsopus, Green.
Anodonta imbecilis, Say.

Dr. J. A. Meigs read some remarks of Mr. Joseph Barnard Davis, reviewing the method of measurement, as a diagnostic means of distinguishing human races, adopted by Drs. Scherzer and Schwarz, in the circumnavigatory expedition of the Austrian vessel Novara.

The number of the Proceedings of the Academy for November was laid on the table.

December 18th.

Dr. RUSCHENBERGER in the Chair.

Thirty-three members present.

A paper was read, entitled, "Reflections upon the nature of the temporary star of the year 1572, an application of the nebular hypothesis, by Alexander Wilcocks, M.D.," and was referred to a committee.

The decease of Dr. H. C. Caldwell, late a member of the Academy, was announced: he died at Lewisburg, Va., Dec. 1st., aged 28 years.

December 20th.

Mr. LEA, President in the Chair.

Forty-five members present.

Papers were presented for publication in the Journal, entitled, "Descriptions of New Cretaceous and Eocene Shells of Mississippi and Alabama, also, with Notes on Eocene Fossil Shells, by T. A. Conrad."

"Descriptions of Exotic Unionidæ, by Isaac Lea."

And were referred to a committee.

The following were presented for publication in the Proceedings:—

"Notice of the Shells collected by Mr. J. Xantus, at Cape San Lucas, by P. P. Carpenter."

"Prodromus Descriptionis Animalium evertebratorum, quæ in Expeditione ad Oceanum Pacificum septentrionalem, a Republica federata missa, Cadwaladaro Ringgold et Johanne Rodgers ducibus observavit et descripsit W. Stimpson: pars vii., Crustacea Macrura."

"Catalogue of the Venomous Serpents in the Museum of the Academy, with notes on the Families, Genera and Species, by E. D. Cope."

And were referred to Committees.

Dec. 27th.

Mr. LEA, President, in the Chair.

Fifty-five members present.

On report of the respective Committees, the paper entitled

"Descriptions of Exotic Unionidæ, by Isaac Lea," was ordered to be published in the Journal.

And the following in the Proceedings:

Descriptions of Three New Species of Exotic Uniones.

BY ISAAC LEA.

UNIO WYNEGUNGAENSIS.—Testâ lævi, ellipticâ, inflatâ, inæquilaterali, posticè subbiangulatâ, anticè obliquè rotundatâ; valvulis subcrassis, anticè crassioribus; natibus prominentibus, ad apices valdè divaricatè undulatis; epidermide luteo-olivâ, micante, obsoletè radiatâ: dentibus cardinalibus subcrassis, suberectis, valdè crenulatis, in utroque valvulo duplicibus; lateralibus sublongis, crassis subrectisque: margaritâ salmonis colore paulisper tinctâ et iridescente.

Hab.—Wynegunga River, 30 miles east of Nagpoor, in the Deccan, Bengal. C. M. Wheatley.

UNIO CONSOBRINUS.—Testâ lævi, ellipticâ, subinflatâ, inæquilaterali, posticè obtusè angulatâ, anticè rotundatâ; valvulis subtenuibus, anticè paulisper crassiusculis; natibus prominulis; epidermide micante, tenebroso-fuscâ, eradiatâ; dentibus cardinalibus parvis, crenulatis, compressis, obliquis, in valvulam dextram duplicibus; lateralibus longis, lamellatis subcurvisque; margaritâ salmonis colore tinctâ et valdè iridescente.

Hab.—China. C. M. Wheatley.

UNIO NAGPOORENSIS.—Testâ lævi, subtriangulari, subinflatâ, inæquilaterali, posticè biangulatâ, anticè rotundâ; valvulis subtenuibus, anticè crassioribus; natibus prominentibus, epidermide rufo-fuscâ, striatâ, eradiatâ, dentibus cardinalibus parvis, compressis, obliquis, crenulatis, in utroque valvulo duplicibus; lateralibus longis, lamellatis curvisque; margaritâ salmonis colore paulisper tinctâ et iridescente.

Hab.—Ambajiri Tank, Nagpoor, Bengal. C. M. Wheatley.

Notice of the Shells collected by Mr. J. Xantus, at Cape St. Lucas.

BY P. P. CARPENTER.

The Mollusca of the Cape, forwarded by Mr. Xantus, are shore shells, mostly dead. They are, however, singularly free from ballast and other usual admixtures, one specimen only being foreign to the American shores. They

have scarcely any species in common with the shells of San Diego, while in general they agree with those of the West American tropical fauna. They are more nearly related to those of Acapulco and Panama than to those of Mazatlan, although in the same latitude on the opposite side of the Gulf. The presence of such shells as *Oniscia tuberculosa*, *Cassis coarctata* and *abbreviata*, *Lathirus castaneus*, *Oliva porphyria*, *Columbella hæmastoma*, *Conus princeps*, &c., several of which are also found at Guaymas, though not at Mazatlan, distinctly points to far more tropical conditions than could have been expected in so high a latitude. The *Trochidæ*, *Patellidæ*, and similar intertidal families, however, bear more near relationship to the shells of Mazatlan; while a solitary, though fine and apparently fresh specimen of *Haliotis splendens*, entirely unknown in the Gulf, serves as a connecting link to the fauna of Lower California.

Catalogue of the Venomous Serpents in the Museum of the Academy of Natural Sciences of Philadelphia, with notes on the families, genera and species.

BY E. D. COPE.

In the cephalic vertebræ of the typical venomous serpents, we observe the greatest modifications of the archetypal vertebra, in the ophidian order. This, which is most excessive in the inferior arches, consists in—

First, the great shortening and thickening of the hæmapophysial element of the nasal vertebra, (superior maxillary,) to serve as a firm foundation for the long curved venom fangs.

Second, its ginglymoid articulation with its neurapophysis (prefrontal), by motion, upon which the fangs are erected or depressed, and—

Third, the great lengthening of the pleurapophysial element of the frontal vertebra, (the tympanic bone), which, acting as a fulcrum, gives the greatest mobility to the articulated pterygoid appendage, the ectopterygoid, and consequently to the superior maxillary.

Thus, it is evident that this modification has immediate reference to the complete specialization, and more perfect exercise of natural functions,—the apprehension of living prey, and its subsequent deglutition.

From the possession of these attributes of high organization, we infer that nature has assigned to the typical venomous serpents the first place in the category of ophidians.

Hence, also, in attempting to define them as a natural group, we look to those points of structure whence we deduce the evidence of superiority.

In the Colubriform venomous serpents, the hæmapophysis of the nasal vertebra still falls considerably short of its hæmal spine, and is much thickened in a vertical direction at its distal end, to give a firm support to the fangs. But a tendency to revert to the ordinary ophidian type is seen in its posterior elongation, its oblique articulation with the shortened ectopterygoid appendage, and its imperfect articulation with the neurapophysis. In consequence of this structure, the external pterygoid muscle plays upon the maxillary bone at a disadvantage, having, in point of fact, but little power to effect the depression of the fangs. The pleurapophysis of the mandibular arch is shortened. The result of this is, that the pterygoid, articulated to a shorter fulcrum, cannot be drawn forward by the spheno-pterygoid muscle to so great an extent; hence much less mobility is given to the dependent ectopterygoid and superior maxillary. Of this group genus Naja, (Laur.) offers a typical example; of the first, Crotalus (Linn).

Nowhere have we a more conclusive example of the futility of attempting to define higher groups by external characters alone; for, in respect to these, the groups, in question, blend in a manner beyond the possibility of satisfactory separation. There are, indeed, external peculiarities, which are highly characteristic of each. On the one hand there are the depressed, scaly head;

the perforate fangs; the absence of solid maxillary teeth; the elliptical pupil. On the other, we observe the elevated, plated head; fangs, which, in closing round the poison duct, have not obliterated the line of junction;* the presence of solid maxillary teeth, and the circular pupil. But in the first, many genera have the head more or less completely plated; Daboia (Gray) has a circular pupil. In the latter, Vermicella (Gr.,) Elaps (L.,) Cyrtophis (Sund.,) and Sipedon (Merr.,) have no solid teeth behind the fangs; Dendraspis (Schl.) has perforated fangs, and Acanthophis (Daud.) has the pupil erect and elliptical.

In recapitulation, we characterize as follows the families Viperidæ and Najidæ, adopting the appellations given them by the Prince of Canino, whose genius here perceived that order, "in tracing which the human mind is only translating into human language, the Divine thoughts expressed in Nature in living realities."†

1. VIPERIDÆ.

Essential char. Superior maxillary bone vertical by excessive abbreviation anteriorly and posteriorly, supporting venom fangs alone; united to the anterior frontal at its upper extremity, and to the ectopterygoid at the lower extremity of its posterior face by ginglymoid articulations. Caudal vertebræ normal, without greatly developed processes.

Characters not universal. Tympanic bone much elongated, giving great breadth to the head posteriorly. Fangs having all external trace of the enfolded canal obliterated. Pupil erect, elliptical. Occipital region scaly.

2. NAJIDÆ.

Essential char. Superior maxillary bone horizontal, abbreviated and supporting venom fangs anteriorly; elongated posteriorly, and united to the prefrontal and shortened ectopterygoid by imperfectly moveable articulations. Caudal vertebræ normal, without greatly developed processes.

Characters not universal. Tympanic bone shortened, causing the head to be but little distinct from the body. Fangs not perfectly consolidated over the canal. Pupil circular. Occipital region plated.

These families correspond to the Solenoglyphes and Proteroglyphes Conocerques, of Dumeril and Bibron. Though the arrangement of these eminent herpetologists is certainly, in this point, more natural than that of the British Museum catalogue, where the Najidæ (Elapsidæ) are placed among the Colubrine snakes; yet it appears to us that they are in error in not considering the sea-snakes, Proteroglyphis Platycerques, as constituting a group of equal rank with those above defined. They are characterized by numerous external peculiarities, and the compression of the caudal vertebræ, and unusual development of their neural and hæmal spines, constitute a modification whose importance may be partly measured by its striking adaptation to a special end in their economy.

3. HYDROPHIDÆ.

Essential char. Superior maxillary bone horizontal, possessing very little mobility; abbreviated, and supporting a grooved fang anteriorly; much elongated posteriorly, and supporting a series of solid teeth. Caudal vertebræ compressed, inferior and superior processes much elongated, to serve as a support to the compressed, oar-like tail. Pupil round (?)

Characters not universal. Head not dilated posteriorly, in consequence of the shortness of the tympanic bone. Body compressed; scales not imbricated, nor united into gastrosteges on the belly. Head plated. Nostrils superior,‡ valvular.

* Termed by herpetologists "grooved," "canneles."
† Agassiz.
‡ Naturus *Daud.* is an exception.

In the fœtal Crotalus the gastrosteges are divided, but they unite into broad shields some time before the young animal bursts its membranous envelope. But it is not until some size is attained that the grooved line where the growing edges of the fang unite and isolate the canal, is obliterated.

Thus we see typified the three families of the venomous serpents, and their relative positions in the scale of being. But these characters, while parallel to those deduced from the skeletal structure, do not, like them, define the groups they characterize.

Those genera of serpents which are characterized by entire urosteges, exhibit a degree of development one step beyond those that have them divided, since the latter retain that arrangement which characterizes the fœtal condition of the former.

I. VIPERIDÆ.

1. *CROTALINÆ.*

Fangs without external groove. Pupil erect, elliptical. Head very distinct. A deep fossa on each side behind the nostrils, partly occupying the excavated, superior maxillary bone.

The genera of this group are here arranged in what appears to be their natural succession, without reference to the position of that which exhibits the highest typical perfection.

		Total species estimated.	Species in Mus. Acad.
A. Vertex symmetrically plated.			
* Urosteges two-rowed.			
Numerous scale-like plates substituted for the frontals,	1. HYPNALE,	?2	1
Frontals, two pairs, regular.	2. TRIGONOCEPHALUS,	4	2
** Urosteges, one-rowed.			
Tail terminating in a horny point.	3. ANCISTRODON,	3	3
Tail terminating in a rattle.	4. CROTALOPHORUS,	5	3
B. Vertex, scaled.			
* Urosteges, one-rowed.			
Tail terminating in a rattle.	5. CROTALUS,	12	8
Tail without rattle.	6. TELEURASPIS,	4	2
** Urosteges, two-rowed.			
† Superciliary region plated.			
Urosteges four-rowed at the tip.	7. LACHESIS,	2	1
Urosteges two-rowed to the tip; scales carinated.	8. BOTHROPS,	10	3
Urosteges two-rowed to the tip; scales smooth.	9. PARIAS,	3	0
Superciliary plates, two pairs,	10. MEGÆRA,	2	0
†† Superciliary region scaled.			
A rudimental superciliary resting on the preoculars.	11. CRYPTELYTROPS,	?2	1
No rudimental superciliary plate.	12. ATROPOS,	3	1

2. *VIPERINÆ.*

Fangs without external groove. Head very distinct. Pupil usually elliptical. No lachrymal fossa.

A. Superciliary region scaled.

* Urosteges two-rowed.

		Total species estimated.	Species in Mus. Acad.
Nostrils lateral; horn-like processes over eyes.	13. CERASTES,	2	1
Nostrils vertical, surrounded by several nasals; pupil erect.	14. CLOTHO,*	?9	2
Nostrils vertical, each in a single nasal; pupil round.	15. DABOIA,	3	0
	** Urosteges one-rowed.		
Nostrils lateral.	16. TOXICOA,	3	1
	B. Superciliary region plated.		
	* Urosteges one-rowed.		
Nostrils lateral.	17. ECHIS,	2	0
	** Urosteges two-rowed.		
Top of head scaled.	18. VIPERA,	2	2
Top of head plated.	19. PELIAS,	1	1

3. *ATRACTASPIDINÆ.*

Fangs without external groove. Head not distinct from the body. Gape small. Pupil round. No lachrymal fossa

Head symmetrically plated: urosteges one-rowed: frontal plates, two pairs.	20. ATRACTASPIS,	1	0
Head symmetrically plated: urosteges one-rowed; frontal plates, one pair.	21. BRACHYCRANION,	1	1

4. *CAUSINÆ.*

Fangs with an indistinct external groove. Head moderately distinct. Pupil round. No lachrymal fossa.

Head symmetrically plated; urosteges two-rowed.	22. CAUSUS,	1	1
	Total,	83	34

1. *CROTALINÆ.*

HYPNALE Fitzinger.

Systema Reptilium, 1843, p. 28.

1. H. n e p a *nobis.*—*Coluber nepa* Laurenti. Spec. Synopsis Reptilium, p. 97, 1768. *Trigonocephalus hypnale* Boie, Schlegel, et aliorum.

Our specimens agree very nearly with the description of Trigonocephalus Z a r a *Gray*, Brit. Mus. Catal. of Snakes, p. 15, in the narrow white vitta upon the temporal region, the brown lips with one or two white spots posteriorly, the white band upon the lower part of the neck, etc.; the scales are smooth except a few dorsal rows, which have traces of carinæ. Dr. Gray's description is, however, so brief, that we cannot, with confidence, refer them to it, the more so as no subsequent author notices its existence. Besides, Dr. Gray's species was brought from Singapore. Two spec. Ceylon, Mr. Cuming.

TRIGONOCEPHALUS Oppel.

Rept. p. 50.

a. Scales carinate. T r i g o n o c e p h a l u s.

2. T. B l o m h o f f i i *Boie.*

Three spec. Ningpo, Dr. McCartee.

*It is probable that some of the species assigned by Dr. Gray to Clotho, belong more properly to Cerastes.

Var. megaspilus *nob.*—Head somewhat broader than usual. Breadth of vertical plate nearly equal to its length. Superciliaries large. Posterior frontals five-sided, not rounded laterally and posteriorly. Temporal region scaled. About twenty large, annular black spots on each side, arranged alternately, and often confluent on the back. These enclose rhomboidal brown spaces, each of which has a central black spot. Gastro- and urosteges black, with a few white variegations. 142 × 1 × 46.

One spec., No. 136. Habitat? Perry Expedition.

b. Scales smooth. Calloselasma *nob.* *Leiolepis* Dum. and Bibr., 1854, *not of Cuvier*, 1829.

3. T. rhodostomus *Boie.*

One spec. Java, Garden of Plants, Paris.

ANCISTRODON Beauv.

Trans. Am. Phil. Soc., iv., 381, 1799. *Cenchris* Daud., Hist. Rept. 1803. *Toxicophis* Troost, Ann. Lyc., New York, iii., 190, 1833.

M. P. de Beauvois, in characterizing this genus, alluded to the characters by which it may be known from all others, viz: the plated head, entire urosteges, and absence of rattle. Hence his name cannot be set aside for Cenchris, of later date. He spelled it Agkistrodon, but according to the universal rule of latinizing the Greek, it should be Ancistrodon.

4. A. contortrix *Bd. & Girard.*

Two spec.	Foxburg, Penna.,	Prof. Baird.
One "	Pottsville,	C. T. Hughes.
" "	South Carolina,	Dr. Holbrook.
Two "	Mobile, Ala.,	Dr. Nott.
Eight "	Kansas,	Dr. Hammond.
Three "	Loc. ignot.,	Dr. Wilson.

5. A. piscivorus *nobis.* *Toxicophis piscivorus* B. & G., Smiths. Catal., p. 19.

One spec.	Adams Co., Miss.,	H. Sargent.
Two "	South Carolina,	Dr. Holbrook.
Two "	Loc. ignot.,	Dr. Wilson and Garden of Plants.

6. A. pugnax *nobis.*—*Toxicophis pugnax* B. & G., Smiths. Cat., p. 20.

Six spec.	Texas,	Dr. Heermann.

CROTALOPHORUS Gray.

Am. Philos. 205, 1825.

7. C. Kirtlandii *Holbr.*	Two spec.	Ohio,	Dr. Holbrook.

8. C. tergeminus *Holbr.*

One spec.	Ohio,	Col. McCall.
" "	Kansas,	Dr. Hammond.
Five "	Loc. ignot.,	Dr. Wilson, *et al.*

9. C. miliarius *Holbr.*

Three spec.	S. Carolina,	Dr. Holbrook.
One "	"	Dr. Leidy.
One "	Georgia,	Dr. Jones.
One "	Florida,	F. Party.

CROTALUS Linn.

Urocrotalon Fitzinger, Syst. Rept. Schema, p. 29.

Uropsophus Wagler, Amphib., p. 176.

The confusion in the synonymy of some of the species of this genus is very great, and is not diminished by the frequent reference of good species by European herpetologists, as varieties of others previously described. Thus in the

Brit. Mus. Catalogue we find terrificus (adamanteus,) and Oregonus referred to durissus (horridus,) and Prof. Jan, Rev. et. Mag. de Zoologie, 1859, p. 156, considers atrox and confluentus as varieties of terrificus (adamanteus.)

10. C. durissus *Linn.* Syst. Naturæ i., p. 214., 1760, (Stockholm Edit.) "Albo flavoque varius maculis rhombeis nigris disco albis."

Caudisona durissus Laur. Rept. p. 93, 1763. *Crotalus durissus* Merr. Syst. Amphib, p. 156, 1820. Cuvier Règne Animal, p. 122, pl. 32 (of the edit. Audouin, Blanchard, etc.) Griffith's edit. do. ix., p. 267. *Crot. horridus* Latreille III., 186, do. Daudin, (1803) Wagler, Schlegel, Gray, Dumeril and Bibron. *C. cascavella* Wagler, Spix Serp., Brazil, p. 60, 1824.

The errors introduced into the synonymy of this species and the C. horridus of Linnæus, by Latreille and Daudin, and perpetuated by subsequent writers, have been clearly set forth by Major J. Le Conte, Pro. Acad. Nat. Sci. vol vi. p. 415.

There are four specimens of this formidable serpent in the Acad. Museum, which illustrate very well the changes which age produces in the plates on the muzzle.

No. 141, brought by Dr. Hering from Surinam, is a very young individual, marked precisely as in Règne Animal Reptilia, pl. 32. There are three pairs of plates all closely in contact on the median line, the first subtriangular, the second oval, the third lie partly between the supercillaries.

No. 3. Surinam, Dr. Hering. This is 2 feet 7½ inches long. The plates are as in the preceding, except that the second pair are broader, and concave. The head is rather narrow, resembling fig. 2, pl. 84 bis of the Erpétologie Generale. This and the last belong to var. c of the Cat. Brit. Mus.

No. 2. Head and tail of a very large individual, Vera Cruz, Dr. Burroughs, the former measuring two inches between the angles of their jaws beneath. Second pair of plates much elongated transversly with some small scales between and around them; of the third pair, one is divided, the other partially; and there are small scales between them and the supercilliaries.

No. 1. Surinam, Dr. Hering. Length four feet five inches. First pair of plates entire; second, divided into three on each side; third, small, in consequence of irregular subdivision.

11. C. terrificus. *Caudisona terrificus* Laurenti Rept. p. 93, 1763. *Crotalus rhombifer* Daud. v., p. 325, 1803. Dumeril and Bibron, 1854. *Crotalus adamanteus* Beauv., Trans. Am. Phil. Soc. iv., p. 368, 1824. Holbrook, Amer. Herp. iii. p. 9, 1842. Baird and Girard, Cat. Smiths. Inst., p. 3, 1853.

One spec.	South Carolina,	Dr. Holbrook.

12. C. atrox *Bd. & Girard.*

Three spec.	Texas,	Dr. Heermann.

13. C. lucifer *B. & G.*

One spec.	S. California,	Smiths. Institut'n.

14. C. oregonus *Holbr.*	One spec.	Oregon,	T. Nuttall.
15. C. cerastes *Hallowell.*	One spec.	California.	D. Heermann.

16. C. confluentus *Say.* *C. Lecontei* Hall. Proc. Acad. Nat. Sci. vi. p. 180.

Fifteen spec.	Kansas,	Dr. Hammond.
Three "	Rocky Mountains,	"
" "	California,	Dr. Heermann.
One "	New Mexico,	Dr. S. Woodhouse.

C. Lecontei was stated to differ from C. confluentus in possessing two rows of scales between the suborbitals and superior labials instead of four; in having a row of four scales between the nasals instead of six; in the less number of longitudinal rows on the body, the absence of a white border to the rostral plate, etc. Examination of the above specimens shows that the number of scales in

the rows between the nasals varies from two to four in the first, from four to six in the second; that the number of rows of supralabials varies from two to three; the rows of scales on the body vary from 24 (the number attributed to L e c o n t e i) to 26; that the rostral plate is often half bordered, sometimes not at all.

17. C. h o r r i d u s *Linn.* Syst. Nat. i. p. 214, Edit. 1760. Cuvier, Règne Animal, ii. p. 78, 1817. *Crotalus durissus* Daud. Hist. Rept. v. 304, 1803. Also of Holbrook, Dumeril and Bibron, Baird and Girard. *Crotalus atricaudatus* Daudin and Wagler. *Uropsophus durissus* Gray, Cat. Brit. Mus. *Urocrotalon durissus* Fitzinger, 1843.

Nine spec.	Penna.	Drs. Mitchell and Rand, and Mr. J. H. Slack.
One "	New Jersey,	Dr. Coleman Pemberton.
" "	Kansas,	Dr. Hammond.
" "	Louisiana,	Dr. P. B. Goddard.
" "	Benton Co., Miss.,	" "
" "	S. Carolina,	Dr. Holbrook.
Ten "	Loc. ignot.	Dr. Wilson, *et al.*

No. 47 (Penna.,) dark variety. The black double rhombs become confluent upon the plants anteriorly, enclosing the lighter ground, which thus forms a series of oblong spots. Posterior rhombs all confluent into transverse black bands. Gastrosteges clouded with brownish black. Nos. 48 and 49 are intermediate between this and the ordinary variety.

The remaining species of this genus are:

C. m o l o s s u s *B. & G.*, Catalogue Serp., Smithson. Inst. p. 10. A very distinct species.

C. o r n a t u s *Hallowell*, Pacific Rail Road Report, x., Parke's Explorations p. 24.

C. t i g r i s *Kennicott*, U. S. and Mex. Boundary Survey Reptiles, p. 12, pl. 4.

C. l u g u b r i s *Jan*, Rev. et. Magasin de Zoologie, 1859, p. 156. This seems to be most nearly related to *C. lucifer* B. & G.

TELEURASPIS nobis.

Head triangular, depressed, covered above with small scales. Muzzle prominent, bordered by a series of small scales; a large superciliary plate on each side as in Bothrops. Urosteges one-rowed; tail without rattle.

The absence of a rattle distinguishes this genus from Crotalus, and the entire urosteges from Bothrops. Its natural situation appears to be between them. The two species which we have seen are both small and widely different from each other.

18. T. S c h l e g e l i *nob.*—*Trigonocephalus Schlegeli* Berthold, Abhandlungen der Königlichen Gesellschaft der Wissenschaften zu Göttingen, iii. p. 13, 1847. Jan, Rev. et Mag. de Zoologie, 1859, p. 155.

Two Spec. Cocuyas de Veraguas, N. Granada. Mr. R. W. Mitchell.

Since the time of its description in 1847, this rare and curious serpent has been, as far as we are aware, unnoticed by authors. As Berthold's description is brief, we subjoin the following:—

Snout rounded, depressed, its plane forming an acute angle with that of the rostral, which is slightly concave. Scales on the head tuberculous or carinate, as are also the supralabials and temporals,—the latter excessively. A series of small tuberculous scales between the superciliary and orbit, two of which are prolonged into compressed horn-like appendages, which are erect and flexible. Scales bordering the muzzle with their outer borders free and recurved. Nasal plate large, the nostril pierced in the centre. Lachrymal fossa large. A slender undivided subocular. Superior labials nine, the third longest; eye over third and fourth. Inferior labials thirteen. Genial *scales* imbricate, acute, some of them carinate. Scales of the body thin, acute, much imbricate, in 24 or 25 longitudinal rows, all carinate except those next the gastrosteges.

[Dec.

No. 99. Bright green with a few dark brown rhombs on the back. On the posterior part of the body, narrow pinkish grey bands, alternate on opposite sides of the median line. The whole upper surface sparsely dotted with brown punctulations. Upper surface of head with two deep brown spots on the muzzle; one on the inner border of each superciliary; a large one on the vertex, with a smaller confluent with it on each side, and two occipital spots. A dark band passes from the orbit beyond the angle of the mouth. Inferior and superior labials white, punctulated and spotted with brown. Beneath, white, shaded with cream color, (in spirits); posteriorly green; the whole punctulated with brown. A series of brown spots on the flanks, which shade the extremities of the gastrosteges.

No. 98 differs in having fewer brown rhombs on the back; and the light transverse vittæ extend to the anterior part of the body. The top of the head is uniform brown, without spots, except the occipital pair. Gastrosteges 151; anal 1, entire; urosteges 52. Length 1 ft. 3 in.

19. T. Castelnaui *nob.*—*Bothrops Castelnaudi* D. & B. vii. p. 1511.
Three spec. South America. Mr. Cuming.

This species has two nasal plates, with the nostril between them. The superciliary plate rests immediately upon the orbit.

Var. brachystoma *nob.*—In this variety the breadth of the head at the angle of the jaws is only two-fifths its length, which is perhaps the result of accident. The labials are 8 above and below, instead of 10 superior and 9 inferior. The brown spot on the head is quadrangular, not cordate; and the labials above and below, and the genials, are brownish black. In other respects it is exactly similar to the true Castelnaui. Longitudinal rows of scales 23. Scuta 154×1×33.

One spec. Habitat? Mr. Cuming.

T. Lansbergii is a third species of this genus. We have not been able to find the original description, but its prominent characters have been pointed out by Prof. Jan, loc. cit. p. 155. T. nummifer, (*Trig. nummifer* Rüppel) is probably a fourth species. There is a possibility, but we have not the means at hand for arriving at a decision, that this is identical with Atropos mexicanus Dum. and Bibr. Vol. vii. p. 521, which has the urosteges entire, and, according to the plate 83, bis. Erp. generale, a small superciliary shield. The latter at least can hardly be considered as congeneric with the Atropos Darwini and puniceus.

LACHESIS Daud.

Hist. Rept. 1803. *Cophias* Merrem, 1820.

20. L. mutus *Daud.* Two spec. Surinam, Dr. Hering.

BOTHROPS Wagler.

In Spix. Rept. Brazil, 1824, p. 50. *Craspedocephalus* Kuhl (18?) Fitzinger (1843), Gray (1849.)

21. B. lanceolatus *Wagl.* Two spec. S. America.

22. B. atrox *Wagl.* *B. leucurus* and *tæniatus* Wagl. *Trigonocephalus colombiensis* Hallow. Proc. Acad. Nat. Sci. ii. p. 246.

Eight spec.	S. America,		Mr. Cuming.
Two "	Cocuyas de Veraguas, New Granada.		Dr. Mitchell.
Five "	Caraccas,		Dr. S. Ashmead.
One "	"		Dr. Morris.
One "	Para,		Col. Abert.
Two "	loc. ignot.		Prof. Bache.

23. B. alternatus *D. & B.*

One spec.	Buenos Ayres,	Mr. Kennedy.
One "	loc. ignot.	?

B. viridis connects the South America and East Indian species inseparably; and so it appears questionable whether B. sumatranus and Homburgii are generically distinct.

CRYPTELYTROPS nobis.

Head very distinct, depressed anteriorly, covered with small smooth scales. Superciliary region covered with small scales, not thickened as in Atropos. Supercilliary plate narrow, rudimentary, resting on the preoculars. Pupil elliptical. Urosteges two-rowed.

24. C. carinatus *nob.*—*Trimesurus carinatus* Gray, Zoological Miscellany, p. 48.

One spec. Hab.? (Probably India)

To Dr. Gray's very brief description we add the following:—Body rather slender, tail moderate. Scales in 25 longitudinal rows, lanceolate, strongly carinate, except a row on each side adjacent to the scuta. Temporals small, keeled. Superior labials small posteriorly, the third largest, eye over the fourth and fifth, from which it is separated by three rows of scales. Gastrosteges 157. One entire anal. 77 Urosteges. Above, dark olive brown, beneath blackish green; a greenish white oval apical spot upon each scale of the smooth series next the scuta on each side.

Trimesurus albolabris Gray, loc. cit., may be a second species of this genus, which intervenes between Bothrops and Atropos.

ATROPOS Wagler.

Nat. Syst. der Amphib. p. 175.

25. A. Darwini *D. & B.* Two spec. Hab.? Dr. Wilson.

In this very vicious looking species all the scales are smooth except a few dorsal rows. No. 100; gastrosteges 165; anal 1, entire; urosteges 51. No. 101; 163×1×53. Prof. Jan (Rev. et Mag. Zoologie, 1859, p. 157,) has described a third Atropos, which has a long horn-like appendage over each eye. This peculiarity, formerly known only in the Cerastes and Clothos of the old world, characterizes three species of American Crotalidæ, viz:—Crotalus cerastes *Hallow*, Atropos undulatus *Jan*, and Teleüraspis Schlegelii *nob.*

2. *VIPERINÆ.*

CERASTES Wagler.

L. c. p. 178.

25. C. Hasselquistii *Gray*, Zool. Misc, 1832. *Coluber cerastes* L. Syst. Nat. 1766. *Cerastes ægyptiacus* D. & B. vii. p. 1440, 1854.*

Two spec. North Africa, Dr. Wilson.

CLOTHO Wagler.

Gray Zool. Misc. 69, 1842. *Echidna* et *Cerastes* pars Wagler, Amphib. 177, '78, 1830. *Echidna* Dum. and Bibr. (not of Merrem,) vii. 1420, 1854.

27. C. rhinoceros.—*Cerastes nasicornis* Hallow. Proc. Acad. Nat. Sci. Phila. iii. p. 319. *Vipera rhinoceros* Schlegel, Verslagen en mededeelingen der Koniglijke Akadamie von Wettenshappen; Amsterdam, iii. p. 316.

Three spec. Gaboon, Dr. Henry A. Ford.

In No. 154 (large specimen), there is on the muzzle, below and in front of each horn-like supranasal, an oval scale, directed outward and upward, and free for the greater part of its length. In No. 155, (still larger specimen,) this scale is produced into a horn, four lines in length. The scales of the head are more strongly carinate and spinous in this than in the last. In C. nasicornis *Gray*, the horns are all developed from the *supranasal plate*, which is the character by which Schlegel distinguishes it.

* Aspis Cleopatræ *Laurenti*, Specimen p. 105, cannot be this species. He says, "squamis planis appressis nec carinatis."

28. C. arietans *Gray.*

One spec.	Senegambia,	John Cassin, Esq.
One "	Cape of Good Hope,	Garden of Plants.
One "	" "	U. S. Exp. Expedition.

This is the type of Bitis *Gray*, in which the supranasal is not developed into a horn. Corneous and squamous appendages are, however, common among the vipers, and occur independently of generic characters. The position of the nostrils and the number of nasal plates are the same in this and the last species.

Echidna (Merrem, 1820) is employed by some authors to designate this genus, but as its type, E. cobra, (Merrem, Systema Amphib. p. 150), cannot be identified,* Dr. Gray adopts Clotho (Wagler.)

TOXICOA Gray.

Cat. Brit. Mus. 1849. (Type Echis arenicola *Boie.*)

29. T. squamigera *nob.* *Echis squamigera* Hallow., Proc. Acad. Nat. Sci. Phila. vii. p. 193.

One sp.	Gaboon.	M. Duchaillu.

Tox. chlorocchis (*Vipera chloroechis* Schlegel, Verslag. der Koniglije Akad. Amsterdam, iii., p. 317, 1855) is allied to this species, but differs in having 23 rows of scales instead of 18; 13 inferior labials instead of 10; and in having "on each side of the back one row of small spots of a light yellow color," instead of irregular transverse fasciæ of the same.

VIPERA Laurenti.

Specimen Synopsis Rept. 99.

30. V. ammodytes *Daudin.*

One spec.	Italy.	Dr. Wilson.

31. V. aspis *Merr.*

Thirteen spec.	Italy.	Dr. Wilson.
Var. ocellata *Bp.*		
Five spec.	"	"
Var. rufa *Bp.*		
Three spec.	"	"
Var. fusca *Bp.*		
Three spec.	"	"
Var. nigra *Bp.*		
Two spec.	"	"

PELIAS Merr.

Syst. Rept. 148.

32. P. berus *Merr.*

One specimen.	Loc. ignot.	Garden of Plants.
Four "	Italy.	Dr. Wilson.
Three "	Lund, Sweden.	J. & H. Rinberg.
Two " (young.)	Italy.	Dr. Wilson.

A half grown specimen, from Italy, has the short muzzle of the variety Ursinii *Bp.*, with the ordinary dark coloring.

Var. niger *Bell.* (?)		
Two spec.	Lund, Sweden.	J. & H. Rinberg.
Var. dorsalis. (*P. dorsalis*, Gray, Zool. Misc., p. 71.)		
One spec.	Lund, Sweden.	J. & H. Rinberg.

Our specimen is not typical of the variety, as the dorsal band—which is eight scales wide—is undulate on the margin, thus approaching the ordinary variety. The muzzle and gape is shorter than usual, thus resembling Ursinii.

* His description, "*Squamis maioribus in carina dorsi*," is, at least, not applicable to any of the true vipers.

Var. Ursinii *Bp.* *Pelias chersea* vel *Ursinii* Bp. Fauna Italica.
One spec. Italy. Dr. Wilson.

The gape and muzzle are shorter, and the latter more sloping than usual. In its light colors, our specimen partakes of the character of a young animal. Many specimens of this strongly-marked variety, and much observation on it in a state of nature are needed to settle satisfactorily its true zoological value. Until proof to the contrary can be adduced, we cannot consider it as more than a variety. How far it coincides with the Coluber chersea of Linnæus is a question.

3. *ATRACTASPIDINÆ.*

BRACHYCHRANION Hallowell.

Proc. Acad. Nat. Sci., vii. p. 99.

Differs from Atractaspis (Smith, Zool. S. Africa, facing pl. 71) in possessing one pair of frontal plates instead of two.

In this genus the tympanic bone is short; but in other respects the mechanism of the bones of the mouth is similar to that of the vipers and rattlesnakes. The superior maxillary bone is very short and vertical, articulating with the lachrymal by a ginglymoid joint at its superior extremity. Its whole lower surface is occupied by the anchylosed bases of the fangs. The ectopterygoid articulates with it moveably, and at a right angle, but is rather short, and incurved posteriorly. While this structure gives its possessor the power of erecting or depressing the fangs, weakness is indicated by the proportions and form of the ectopterygoid and tympanic bones, and by the small size of the spheno- and external pterygoid muscles. The former is not larger than in an adult Tropidonotus sirtalis. Though the gape of the mouth in Dr. Hallowell's species is small, the fangs are probably as efficient as in some species of Elaps, which, it has been shown by the experiments of Dr. Cantor, are unable to inflict a wound on any but very small objects.

33. B. corpulentum *Hallowell.* *Atractaspis corpulentus* Hallow. Proc. Acad. Nat. Sci. 1857, p. 70. Günther, Cat. Colubr. Brit. Mus. p. 239.
One spec. Gaboon. Dr. H. Ford.

4. *CAUSINÆ.*

CAUSUS Wagler.

Natur. Syst. Amphib. 172.

While this genus exhibits a close conformity to the succeeding group in external characters, it maintains that modification of the cephalic vertebræ which we deem characteristic of the highest family of Ophidians, the true venomous serpents.

Thus it is that, while this group (Viperidæ) may be distinctly defined by that modification of the ideal by which the neuro-skeletal structure is adapted to an end in the economy of the animal, those external peculiarities which are of no obvious value to their possessors connect it inseparably with that succeeding, and add another to the many proofs that the works of Creation form a graduated and connected whole.

34. C. rhombeatus *Licht.*
One spec. Cape of Good Hope. Garden of Plants.
Four. Liberia. Dr. Goheen.

II. NAJIDÆ.

1. *NAJINÆ.*

Fangs with an external groove, extending from the basal to the terminal orifice.

ACANTHOPHIS Daudin.

Hist. Rept. v. p. 289, 1803.

35. A. antarctica *Wagler. Boa antarctica* Shaw. *Acanthophis cerastinus*, Daud. Hist. Rept. 1803.

Superior maxillary bone elongated posteriorly, not compressed, rounded on its outer face; the ectopterygoid curves inward and articulates with it obliquely. The fang is long, with a delicate groove on its anterior face, extending from the basal to the terminal orifice. Behind it there are two small, greatly recurved solid teeth, the last upon the very edge of the articulation with the ectopterygoid, and both are concealed by the integuments.

In an undoubted and beautiful specimen of this snake, received from the Garden of Plants, Paris, these characters are distinct. Hence we feel assured that its true position is in the family Najidæ, and that Pseudechis and Hoplocephalus are its natural allies. Thus, while so large a proportion of Australia's mammals are Marsupials—her birds, Raptores, Psittaci and Cursores; her mollusca, Brachiopods; her lizards, Scinks, etc.—her venomous serpents are all Najidæ; nor has she a solitary example of the higher Viperidæ.

HOPLOCEPHALUS, Cuvier.

Règne Animal, ii. p. 95. *Alecto*, Dum. & Bibr. 1854. (Not of Wagler, 1830, the type of whose genus is Trimeresurus leptocephalus, *Lacep.*)

36. H. pallidiceps *Gray* (?) var.

Scales in fifteen longitudinal rows. Superior labials six, second and third truncated above. Two inferior labials in contact with the inframaxillaries, (three in curtus.) Row of scales next the scuta yellow at their bases, more conspicuous anteriorly. Beneath, yellowish olive, more yellow anteriorly. Head above, uniform deep olive brown; the vertical plate is nearly as broad as long, and much depressed. The muzzle is broad and rounded. Body above deep olive brown. Where the epidermis is lost, olive-yellow transverse bands, about two half scales in width, alternating with the darker, which occupies a width of one scale and a half, appear, but they are very indistinct; obsolete anteriorly.

One spec. Australia. Gard. of Plants. (As *Alecto curta.*)

Our specimen approaches very near to the pallidiceps *Gray*, but its identity cannot be established without additional examples.

SEPEDON Cuvier.

R. An. ii., 86.

37. S. hæmachates *Merrem.*

One sp.	Cape of Good Hope.	Garden of Plants.
One sp.	" "	Dr. Wilson.

NAJA Laurenti.

Specimen, p. 90.

38. N. haje *Merr.*	One sp.		Garden of Plants.
Var. melanoleuca *Hallowell.*	Four sp.	Gaboon.	Dr. H. A. Ford.

39. N. tripudians *Merr.* Var. with the spectacle-like marks.

One sp.	Bengal.	W. Jones.
Three sp.	?	?

Var. uniform brown, without the spectacle-like marks.

One sp.	Java.	Dr. Ruschenberger.

Var. scopinucha *nob.*—Light brown, annulated with narrow white rings, which are not continued upon the pale brown belly. Throat nearly white, with a black annulation covering from the fourteenth to the seventeenth gastrosteges. The back of the neck black, with a white circle, emarginate in front, and having a central black spot, with a small dot on each side of it.

One sp.	Canton River.	Dr. W. S. W. Ruschenberger.

A specimen nearly similar to this singular variety, brought from China by Mr. Gernaert, came under the notice of the authors of the Erpetologie Generale, and is described vii., p. 1297.

BUNGARUS Daudin.

Hist. Rept. v., 263.

40. B. semifasciatus *Kuhl.*

One sp.	Java.	Dr. Ruschenberger.
One sp.	?	?

41. B. fasciatus *Cantor.* Var. B. (Brit. Mus. Catalogue.)

Three sp.	Ceylon.	Mr. Cuming.
One (young) sp.	"	"

ELAPS Schneider.

Hist. Amphib. ii., p. 289.

a. Asiatic.

42. E. calligaster *Weigmann.*

One sp.	Philippine Is.	Mr. Cuming.

b. African.

43. E. lacteus *Schn.* (*Coluber lacteus* L. 1754. *Col. Hygiæ* Shaw, 1792. *Elaps Hygiæ*, Merr. 1821.)

One sp.	Cape of Good Hope.	Garden of Plants.

c. American.

*Body with complete isolated rings, with spots between them.

44. E. fulvius *Cuv.*

One sp.		Dr. Bacne.
One sp.	Charleston, S. C.	Smithsonian Inst.
Four sp.	?	?
One sp.	South Carolina.	Jas. Reade.
One sp.	"	Dr. Blanding.
One sp.	Texas.	Dr. Heermann.

45. E. aglæope *nobis.* Head slightly distinct from the body, oval, muzzle elliptically rounded. Not a slender species. Tail long, one-seventh of the total length.

Rostral plate small. Anterior frontals very small; posterior frontals nearly as broad as the length of the vertical, and a little longer than the superciliaries. Vertical small, two-fifths of its length between the occipitals. Scales in fifteen longitudinal rows. Rings black, three scales (in a straight line,) and three or four gastrosteges in width. Spaces between, five or five and a half scales wide, with a delicate light brown ground color, but divided by a vermillion ring, three scales wide. This is wider on the belly and adjacent to the black, except when occasionally separated by a yellow gastrostege. In the middle of the vermillion is a series of elongate black spots one scale wide, sometimes confluent into a band, not reaching the gastrosteges. A black collar involves the tips of the occipitals, half the last superior and inferior labial, and the first three gastrosteges. In front of this a band of delicate brown includes the occipitals and extends to the labials; the latter are yellow. The inferior labials (except a black spot on the second and third,) and the inframaxillaries, are also yellow. The rostral, and anterior frontals are brownish yellow, (perhaps shaded with red in life). The rest of the head, extending backward from the first and second superior labials, to the postoculars, and anterior edge of occipitals, is black. There is a spot of the same color on the line between the occipital plates.

Gastrosteges 207, anal one, urosteges 52, first seven undivided.

Total length 31 inches. Tail 4 inches, 6 lines.

One specimen, brought by Dr. Jno. L. Le Conte from Honduras.

A beautiful species, related to fulvius, apiatus, tener, etc.

**Body with rings at equal distances, without spots between.

46. E. circinalis *D. & B.*

One sp.	West Indies.	Mr. Engstrom.
Two sp.	?	?

In one of our specimens all the rings are complete, in another several are incomplete, appearing as elongate oval spots bordered with yellow, and in the third, as many as five successive rings are wanting on the gastrosteges. This appears to be a smaller and darker colored species than corallinus, of which some consider it a variety.

47. E. corallinus *Neuwied.*

Two sp.	South America.	?

48. E. nigrocinctus *Girard*, Proc. Acad. Nat. Sci., vii., p. 226, 1854 ??? U. S. Astronomical Exped. ii., p. 310. Aug. 1855. *E. divaricatus*, Hallow. Jour. Acad. Nat. Sci. iii., p. 36, May, 1855.

Three sp.	Honduras.	Dr. J. L. Le Conte.
Two sp.	Panama.	"
One sp.	Nicaragua.	Mr. Amory Edwards.

The coloring of the body of this species is that of corallinus, while the head has that of fulvius.

***Rings complete, arranged three and three.

49. E. altirostris, *nobis.* Head scarcely distinct, lanceolate, compressed, its height and breadth at the eye equal. Muzzle rounded, narrow, high, prominent. Cephalic shields large; superior labials seven, high; the eye resting on the division line of the third and fourth. Tail short, (possibly mutilated,) one eighteenth of the whole length.

Scales in fifteen rows.

Colors in spirits. Body with fourteen triads of complete rings of a deep chocolate brown, sometimes confluent on the belly. Spaces between these four or five scales wide, of a pale yellow brown shade, each scale tipped with darker. Spaces between outer and central rings of the triads covering two scales, which are broadly tipped with chocolate. The color of the head is a continuation of that of the anterior outer ring of the first triad. The following, however, are the markings of white: The occipitals (except the outer borders) and plates surrounding them; the anterior borders of the inframaxillaries and inferior labials; a line bordering the fifth superior labial above, and reaching to the occiput.

Gastrosteges 194; anal 1, divided; urosteges 15. Length 29 inches, 6 lines; tail 1 inch, 5 lines.

One sp.	?	?

A robust species, resembling E. lemniscatus, except in the color and form of the head. In respect to the latter, it differs from any other species which we have seen, but resembles the figure of E. Bertholdi, Jan. loc. cit., except in the absence of the preocular.

59. E. dissoleucus *nobis.* Head slightly distinct, muzzle acutely rounded and projecting. Body not slender, not stout. Tail distinct, tapering, short, one-eighteenth of the total length.

Vertical plate small, elongate, obtuse behind; supercilliaries broad; occipitals very elongate; eyes very small. Scales fifteen rows. Body red, with seven sets of three black rings together; the central ring not twice as wide as the exterior ones, and separated from them on each side by ring of white, four scales wide; each white scale bordered with black. Viewed from above the head, and for four scales behind the occipital plates is black, except a band of red, which includes the fifth, sixth, and most of seventh superior labials, nearly all the postoculars, anterior part of the occipitals, but not extending across the median line, which is black. On the throat and chin the black only appears on three gastrosteges, and the front inferior labials.

Gastrosteges 200; anal 1, divided; urosteges 19. Length 22 inches, 6 lines; of tail 1 inch, 4 lines.

One sp.	Venezuela.	Dr. Chas. D. Meigs.

One of the most elegant species of the genus, and having some similarity to E. elegans *Jan*, Rev. et Mag. Zool., 1858, p. 524. The rings which are white

in dissoleucus, are yellow, and much narrower in elegans; the latter has a yellow ring round the neck, and the black does not extend upon the throat.

51. E. Marcgravii? *Neuweid.* Two sp. Dr. Wilson.

52. E. lemniscatus *Schneider.*
One sp. Surinam. Dr. Hering.
One sp.

53. E frontalis *D. & B.*
One sp. South America. Dr. Wilson.
Two sp. " ?

54. E. baliocoryphus *nobis.* Body rather stout. Head broad, depressed, but still distinct. Tail short, one-fourteenth of total length. Scales in fifteen rows.

Fifteen triads of black rings four scales apart posteriorly, increasing in distance anteriorly to eight. Scales in these intervals broadly tipped with brownish black. Exterior ring of the three, two and two and a half scales wide, separated by a space of equal width from the central, which is three and four scales wide. The first ring is four scales back of the occipital plates. The scales in this interval, and the temporals are broadly tipped with black. Occipitals black, anteriorly and posteriorly edged with the light color, perhaps red in life. A spot below and in front of the eye, the superciliaries and vertical black, the last pale-edged anteriorly. Post-frontals immaculate, pre-frontals black, anteriorly light-edged; apex of rostral black. Except three black blotches on the chin, the other plates of the head are of the light color.

Gastrosteges 226; anal one, divided; urosteges 26 pairs.

Length 2 feet, 8 inches. The tail 1 inch, 9 lines.
One sp. Buenos Ayres. Dr. Kennedy.

This species resembles E. lemniscatus somewhat; it is peculiar for the shortness of the head.

55. E. surinamensis *Cuv.*
One sp. Surinam. Dr. Colhoun.

2. *DENDRASPIDINÆ.*

Fangs without external trace of the canal.

DENDRASPIS Schlegel.

Verslag. Zool. genootsch. Amsterd., 1848. *Dinophis* Hallow., Proc. Acad. Nat. Sci., 1852, p. 203.

56. D. Jamesoni *Schlegel. Elaps Jamesoni* Traill, Trans. Schlegel's Essai, p. 179, 1843. *Dinophis Hammondii* Hallow., loc. cit.
Two sp. Liberia. Dr. Gobeen.

In this species the superior maxillary bone is elongate, and much compressed, not offering any plane surface for the attachment of solid teeth. There is a malar process of considerable length, which is connected by ligament with the posterior frontal bone.

III. HYDROPHIDÆ.*

PLATURUS Latr.

Rept. Tome iv., p. 185.

57. P. fasciatus *Daudin.*
One sp. East Indian Ocean. C. Guillou.

DISTEIRA Lacep.

Ann. Mus. Fr., iv., p. 199.

*Swainson, Fishes Amphibia, etc. Lardner's Cab. Cyc., 1839. Hydridæ, Gray, Zoolog. Miscell., 1842.

We suspect that the true ground of separation of this genus from Hydrophis will be found to be the separation of the frontals from the superior labials by the intervention of the fronto-nasals and preocular, and not the presence of rudimentary gastrosteges. The latter peculiarity is possessed in a less degree by Hydrophia striata, H. nigrocincta, and others. The genus thus defined would include H. pachycercus, *Fischer*, loc. cit., pl. 2. Should it, however, be the opinion of herpetologists that the genus be referred to Hydrophis, as has been done by Dr. J. G. Fischer, the species which we possess must still continue distinct, as observed by Prof. Jan, its describer.

58. D. Dumerilii *Jan*, Rev. et Mag. de Zoologie, 1859, p. 149. A line from the nostril to the posterior border of the fronto-nasal separates a part of it, which is analogous to the nasal. One postocular. Except two on the neck the slate-black rings are complete, and occupy three gastrosteges. The back between the rings is light slate-color. Tail slate black.

One sp.	?	?

HYDROPHIS Daud.

Hist. Rept. vii.

59. H. Schlegeli *Fischer*. Abhandl. der Naturwissenschaftlichen Hamburg, iii., p. 50, 1856. *Thalassophis Schlegeli* Schmidt, ibid. ii., p. 83, 1848. ? *Chitulia inornata* Gray, Cat. Brit. Mus., p. 56, 1849.

One sp.	Manilla.	Dr. Burroughs.

60. H. gracilis *Schlegel*. *Microcephalophis gracilis* Lesson, Voy. Belanger. Gray, Cat. Brit. Mus.

One sp.	Gulf of Siam.	A. A. Henderson.

61. H. striatus *Schlegel*.

One sp.	?	?

62. H. pelamidoides *Schlegel*. Fauna Japonica, 1838. Lapemis Hardwickii, Gray, Zool. Misc., 1842.

Four sp.	Gulf of Siam.	A. A. Henderson.
One sp.	" "	Dr. Burroughs.
One sp.	Java.	Capt. Harwick.
Five sp.	?	?

Two of our specimens have two postoculars on each side. One of these has a large loral on each side. Another has two postoculars on one side, one on the other.

Var. annulata *Fischer*, loc. cit., pl. 3.

One sp.	Manilla.	Dr. Burroughs.

While our specimen coincides in all important particulars with Dr. Fischer's plate cited, it differs in having the bands of a chocolate color, each dark scale with a light shade in the middle. The body is rather more compressed than in the ordinary pelamidoides, and there are no traces of carination. Num Lapemis curtus, Gray, loc. cit?

PELAMIS Daud.

Rept. vii., p. 366, 1802.

63. P. bicolor *Daud.*

Two sp.	Gulf of Siam.	A. A. Henderson.
One sp.	Philippines.	Mr. Cuming.
Four sp.	East Indies.	Dr. Burroughs.
Three sp.	"	?
One sp.	Pacific coast of Panama.	Dr. J. L. Le Conte.

Total number of species:

Viperidæ,	34
Najidæ,	22
Hydrophidæ,	7

The Reports of the Recording Secretary, Librarian and Curators were read, as follows:

REPORT OF THE RECORDING SECRETARY FOR 1859.

During the year ending 30th Nov., 1859, there have been elected fifty-nine members and twenty-nine correspondents.

One member has resigned.

One member has been expelled.

Six members have died, to wit: Dr. Charles F. Beck, Dr. Thomas D. Mütter, Dr. Henry Bond, Mr. Henry Pepper, Augustus E. Jessup, Esq., and Dr. H. C. Caldwell, U. S. Navy.

The deaths of the following correspondents have been announced: Mr. W. J. Broderip, Alexander Von Humboldt, Mr. Thos. Sutton Nuttall, Mr. Thomas Horsfield.

During the same period, the following Papers have been read before the Academy, and ordered to be published:

By Walter F. Atlee, M. D., "Observations on a probable cause of Hæmorrhoids," read before the Biological Department.

By Spencer F. Baird, M. D., two, to wit: "Description of new Genera and Species of North American Lizards, in the Museum of the Smithsonian Institution." "Notes on a Collection of Birds, made by John Xantus, Esq., at Cape San Lucas, Lower California.

By W. G. Binney, "Notes on American Land Shells, No. 5.

By John Cassin, two to wit: "Catalogue of Birds, collected on rivers Camma and Ogobai, Western Africa, by Mr. P. B. Duchaillu, in 1858, with notes and descriptions of new Species," two papers.

By E. D. Cope, two, to wit: "On the primary Divisions of the Salamandridæ, with a description of two new Species." "Notes and Descriptions of foreign Reptiles."

By Brackenridge Clemens, M. D., three, to wit: "A Synopsis of the North American Sphingidæ." "Contributions to American Lepidopterology," two papers.

By William M. Gabb, two, to wit: "Catalogue of the invertebrate Fossils, of the cretaceous formation of the United States." "Description of two new Species of carboniferous Fossils."

By Theodore Gill, ten, to wit: "On Datyloscopus and Leptoscopus, two new Genera of the family Uranoscopidæ." "On the Genus Callionymus of Authors." "Decription of Hyporhampus, a new Genus of Fishes, allied to Hemirhamphus Cuv." "Notes on a collection of Japanese Fishes, made by Dr. J. Morrow." "Description of a third Genus of Hemirhamphiræ." "Description of a new Genus of Salarianiæ, from the West Indies." "Description of a new Species of Callinidea Ed." "Descriptions of new generic Types of Cottoids, from the collection of the North Pacific Exploring Expedition, under Com. John Rogers." "Description of a Type of Golioids, intermediate between Bobina and Tridentigerina." "Description of a new North American Type of Siluroids, allied to Calliophysus."

By Charles Girard, M. D., six, to wit: "Ichthyological Notices," five papers. "Herpetological Notices."

By W. A. Hammond, M. D., "Observations on the colorless Blood Corpuscles," read before the Biological Department.

By J. J. Hayes, M. D., "Observations upon the relations existing between Food and the capabilities of men to resist low temperatures," read before the Biological Department."

By T. Charlton Henry, M. D., "Catalogue of the Birds of New Mexico, as compiled from Notes and Observations made while in that Territory, during a residence of six years."

By R. Kennicott, "Notes on Coluber Calligaster Say, and Descriptions of

new Species of Serpents, in the Collection of the Northwestern University of Evanstown, Ill."

By Isaac Lea, LLD., eight, to wit: "Description of eight new Species of Unionidæ, from Georgia." "Description of twenty-one new Species of Exotic Unionidæ." "Description of two new Species of Unionidæ, from Georgia." "Description of seven new Species of Uniones." "New Unionidæ, of the United States." "Description of twelve new Species of Uniones, from Georgia." "Description of four new Species of exotic Unionidæ.' "Description of a new Species of Unio, from the Isthmus of Darien."

By John Le Conte, three, to wit: "Description of two new Species of Tortoise." "Observations on the Species of Nicotiana." "Descriptions of new Species of the Coleopterous Family Histeridæ."

By John L. Le Conte, M. D., two, to wit: "Catalogue of Coleoptera, of Fort Tejon, Cal." "Additions to the Coleopterous Fauna of Northern California and Oregon."

By Joseph Leidy, M. D., "On the seat of the vesicating principle of the Lytta vittata," read before the Biological Department.

By F. B Meek and F. V. Hayden, M. D., two, to wit: "Remarks on the lower cretaceous Beds of Kansas and Nebraska, with descriptions of some rare Species of carboniferous Fossils from the Valley of the Kansas River." "Geological Explorations in Kansas Territory."

By. S. W. Mitchell, M. D., two, to wit: "Observations on the exposed Hearts of Animals," and "On the production of Cataract in Frogs by the injection of large doses of Sugar." Read before the Biological Department.

By S. W. Mitchell, M. D., and W. A. Hammond, M. D., two, to wit: "On two new varieties of Woorara, Coroval and Vao," and "An experimental Examination of the Physiological Effects of Sassy Bark, the ordeal Poison of the Western Coast of Africa," read before the Biological Department.

By James Aitken Meigs, M. D., "Description of a deformed, fragmentary human Skull, found in an ancient quarry cave at Jerusalem, with an attempt to determine by its configuration alone the Ethnical type to which it belongs."

By R. Von Ostensacken, "New Genera and Species of North American Tipuli, with short Palpi, with an attempt at a new classification of the Tribe."

By J. H. Packard, M. D., "The pathological Relations of Cancer and Tubercle," read before the Biological Department.

By H. D. Schmidt, M. D., "An Abstract of the most important Points of Researches on the minute Anatomy of the Human Liver," read before the Biological Department.

By Wm. Stimpson, "Prodromus Descriptionis Animalium evertebratorum quæ in Expeditione ad Oceanum Pacificum septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rogers ducibus, observavit et descripsit W. Stimpson. Pars septa, Crustacea Anomoura."

By Wm. J. Taylor, "Minerological Notes," No. II

By J. J. Woodward, M. D, "On Suppuration in Cancerous Growths," read before the Biological Department.

By John Xantus, two, to wit: "Catalogue of Birds collected in the vicinity of Fort Tejon, Cal., with a description of a new Species of Syrnium." "Descriptions of new Species of Birds from Cape San Lucas, Lower California."

In all sixty-two papers.

During the same period the By-Laws have been amended as follows:

Art. VI. of Chapter V., altered to read thus:

The duty of the Librarian shall be to attend daily at the hall, at such hours as may be deemed expedient by the Library Committee, to take charge of all books belonging to the Academy, under the rules prescribed in Chapter VII., to keep a correct list of all donations or deposits of books, of those missing, and to report on the state of the Library at the last Stated Meeting in December.

Art. VIII. of the same chapter was repealed.

Art. VI. to XI., inclusive of Chapter VII., were repealed, and a new Article substituted to read thus:

Art. VI. No book, the property of the Academy, shall be loaned from the Library under any pretence or for any purpose whatsoever.

And that Article XII. of Chapter VII. be called Article VII.

Adopted 25th January, 1859.

Chapter XII. was amended as follows:

Strike out from Art. VI. the words "and members" at the end of the second line.

Strike out Article VII. and insert instead thereof—Any member of the Academy may become a member of any Department by addressing a written notice to its Director, and by signing an obligation to conform to its regulations in every respect.

Amend Art. VIII. by striking out from the first line the words "elect," and also the last sentence of said Article, to wit: In other respects the By-Laws (Chap. II.) which govern the election of members and correspondents of the Academy, shall apply also to the election of members of any of its departments."

Amend Art. XIX. by striking out from second line the words "in the Proceedings of the Journal of the Academy."

Adopted 31st May, 1859.

All of which is respectfully submitted

B. HOWARD RAND, M. D.

Recording Secretary.

Hall of the Academy, 27th December, 1859.

REPORT OF THE LIBRARIAN FOR 1859.

During the year which has just closed, the Library of the Academy has been increased by 389 volumes, and 714 periodicals and pamphlets, all of them directly connected with the Natural Sciences. Of these works 94 are from the authors, 103 from editors, 348 from Societies, 120 from members, correspondents, the Biological Department and others, and 428 from Dr. Thomas B. Wilson; making in all, 1093 additions to the Library. 1032 volumes have been bound during the year, 992 at the expense of Dr. Wilson and 40 by the Academy.

The rapid increase of the Journals and Periodicals of the various scientific societies, as well as of those published by individuals with whom the Academy exchanges, will soon require additional room for the accommodation of this very important part of the Library. This can readily be obtained by constructing two rows of cases on the top of those in the middle of the west, or Journal room of the Library, with galleries such as are on the sides of the room. By removing those journals which are least frequently consulted to these upper cases, room will be gained for the increase of several years.

It is proposed during the coming year to commence, and, if possible, complete a full catalogue of all the works now in the Library. Few students are aware of the great and varied richness of the collection of books belonging to the Academy, because no catalogue of it has been published since 1836, and the number of volumes has been more than tripled since that time. It is believed that, in some of the departments of Natural Science, almost every important work that has yet been published may be found. A complete and full catalogue would make known to many at a distance, *where* the works which it is important for them to consult can be found, and thus students would be saved from much perplexity and loss of time, and the progress of Science materially aided, while the Academy would derive great benefit from the increase of scientific men among us.

Respectfully submitted,

JAMES C. FISHER, M.D.,

Librarian.

[Dec.

REPORT OF THE CURATORS FOR 1859.

The Curators take pleasure in referring to the excellent state of preservation of the Museum, and to its nearly complete arrangement.

Mr. J. H. Slack, who has taken charge of and labelled the collection of mammalia, informs us that the cabinet contains 740 mounted specimens of 379 species of 123 genera. The arrangement of the ornithological collection, to which Dr. T. B. Wilson has devoted so much time, is rapidly approaching its conclusion. The care of the herpetological cabinet, which for some time had lost the valuable services of Dr. Hallowell, in consequence of illness, has now been undertaken by E. D. Cope, a young man who gives promise of much future usefulness, both to the Academy and to Natural History. Dr. Bridges continues with the arrangement of the fishes, as well as to give the aid of his valuable judgment in everything appertaining to the welfare of the Academy. In relation to the conchological cabinet, Mr. W. G. Binney informs us that he has arranged and labelled all the American species of shells, and has prepared a catalogue for publication. He adds, that our respected President, Mr. Lea, has kindly offered to arrange all the Naïades of the collection. Mr. L. has already completed several of the groups into which he divides them, following the plan of his admirable synopsis. The arrangement of the long-neglected collection of invertebrate fossils has been undertaken by Wm. M. Gabb, a young and zealous naturalist, who gives many evidences of future usefulness to the Natural Sciences.

Additions to the Museum during the year about closing are as follow:

Mammals.—Of these, there were presented 38 specimens of 32 species, principally from the Smithsonian Institution, J. W. Gregory, and Geo. Davidson.

Birds.—Of these, Dr. T. C. Henry presented 68 skins of 50 species from New Mexico. There were 19 other specimens of 14 species, together with 2 nests and 3 species of eggs, received from various members.

Reptiles.—Of these, there were presented 24 specimens of 16 species, principally by Dr. J. E. Semple, C. Herring, and Major Le Conte. Collections from Central America, the species not indicated, were received from J. S. Hawkins, Dr. J. L. Le Conte, and Dr. John Gallaer; and small collections were given by John Krider and Joseph Hanson.

Fishes.—Of these, there were presented 92 specimens of about 60 species by Prof. Holbrook, of Charleston, J. H. Slack, Geo. Davidson, C. C. Abbott, Dr. Corse, and others.

Mollusks.—Of these, there were presented 38 species by W. G. Binney, Isaac Lea, and others. Small collections were also received from Mr. Whelan, J. H. Slack, and S. Powel.

Articulates.—Of Crustacea, 22 species were presented, most of them from Mr. Slack. Of insects, there were 18 species presented, besides a collection of Hymenoptera, Hemiptera, and Lepidoptera of California, from John Xantus. A large collection of Arachnides, from Western America, was presented by Dr. W. A. Hammond. There were also received two Myriapods, and a small collection of Marine Annelides.

Radiates.—Of these, there were 20 species presented.

Anatomy.—A fine skeleton of a horse was presented by James Hammill. Six skeletons and 40 skulls of 37 species of mammals were deposited by Mr. Slack. Twelve human skulls, of various races, were presented or deposited by Dr. J. Letterman, Dr. J. D. Bruns, of Charleston, C. C. Abbott, and others. There were also presented 29 skeletons, skulls, and other anatomical specimens by various members.

Fossils.—A collection of remains of the Hippopotamus, etc. of Europe was presented by Isaac Lea; a collection of remains of Mosasaurus, an unknown Saurian, Sharks, Pycnodus, and Enchodus, from New Jersey, by J. H. Slack; remains of a whale and shark, from Virginia, by Dr. Al. Bryant; remains of reptiles and fishes, from the Phœnixville slates, by Messrs. Vaux, Sergeant,

and Powel; remains of ganoid fishes, from carboniferous deposits of Virginia, by Dr. P. W. Mosblech; the humerus of a Mosasaurus, by M. P. Rue; the lower jaw of Dromatherium sylvestre, and other interesting fossils, from North Carolina, by Prof. E. Emmons; remains of Holcodus, by W. P. Foulke; and remains of mammals, reptiles, and fishes, from the post pliocene formations of South Carolina, by Prof. F. S. Holmes. There were also presented 83 specimens of vertebrated remains, principally by O. R. Willis, T. M. Perrine, Dr. John Evans, D. Baird, W. J. Taylor, A. H. Smith, Dr. Hartman, and W. Stimpson. Small collections were also received from J. R. Snowden, Mr. Slack, and Mr. Gabb.

A collection of Permian and Carboniferous fossils, obtained by Messrs. Meek and Hayden in Kansas, was presented by Drs. Wilson and Leidy, and Messrs. Jeanes, Harris, Lea, and Harrison. There were also presented 37 specimens of 24 species of fossil shells, etc.; and small collections of the same, principally by Prof. Emmons, C. M. Wheatley, Dr. Moore, R. E. Rogers, T. A. Conrad, J. H. Slack, and Wm. M. Gabb.

Of fossil plants there were presented 16 specimens, among which was a magnificent Lepidodendron, from Eugene Borda.

An interesting collection of muds and lignites of Washington Territory, and of waters and minerals of the Geysers of California, were presented by George Davidson.

Minerals.—Of these, 80 specimens of about 20 species were presented, principally by W. J. Taylor, Mr. Hoopes, Mr. Rand, W. P. Foulke, and Dr. Semple. A large collection of polished tablets of minerals was likewise deposited by Ed. J. Willcox; and a collection of volcanic minerals was presented by J. H. Clark.

Botany.—In this department, J. H. Lapham presented 60 species of plants of Wisconsin, and Chas. R. Buckalew 43 species from the Andes. There were also received 10 botanical specimens of various kinds.

Miscellaneous.—Of various objects, not coming under the head of the above departments, twenty were presented, among which was a fine stereoscope from J. W. Queen, and a dissecting microscope and Camera lucida from the executors of the late Dr. Beck.

There was also purchased for the use of the Academy one of Zentmayer's excellent microscope stands, together with some accessory apparatus. The expense was defrayed through subscription of the executors of the late Dr. Mitchell, and partly from the sale of an old microscope formerly deposited by Mr. Wetherill, and finally, according to the promise of the latter, becoming the property of the Academy on his death.

In conclusion, the Report is respectfully submitted by

JOSEPH LEIDY,

Chairman of the Curators.

Dr. Fisher made the following statement:

Mr. Doubleday having given the specific name "Astarte" to a Melitæa which he has himself since transferred to the genus Argynnis, his name will, of course, have the priority, and it is therefore proposed to change the name of the Lepidopteron described in the Proceedings of the Academy of Natural Sciences for 1858, page 179, to Argynnis Ashtaroth, the ancient Phœnician name of Venus.

The death of Augustus E. Jessup, Esq., late a member of the Academy was announced; he died at Wilmington, Del., on the 17th inst., aged 63.

The election of officers for the ensuing year was held in accordance with the By-Laws, with the following result:

President, ...	ISAAC LEA.
Vice-Presidents, ...	Robert Bridges, John LeConte.
Corresponding Secretary, . .	Thos. Stewardson.
Recording Secretary, . . .	B. H. Rand.
Librarian, ...	Jas. C. Fisher.
Treasurer, ...	Geo. W. Carpenter.
Curators, ...	Joseph Leidy, Wm. S. Vaux, John Cassin, J. D. Sergeant.
Auditors, ...	Wm. S. Vaux, Joseph Jeanes, Aubrey H. Smith.
Publication Committee, . . .	Wm. S. Vaux, Isaac Lea, Robert Bridges, Joseph Leidy, W. S. W. Ruschenberger.

Elections in 1859.

The following persons were elected members, viz:—

Jan. 25. Benj. H. Shoemaker, Jonathan C. Letterman, M. D., U. S. A., Emlen T. Littell, Francis Peters, Francis E. Patterson, W. C. Henszey.

Feb. 22. Robert Harford Hare, John Bohlen, Wilson C. Swann, M. D., Louis Audenreid.

March 29. J. Hinckley Clark, Joseph Lesley, Jr., Thomas A. Biddle, John T. Darby, M. D., Saunders Lewis, John Krider.

April 26. John Haseltine, Ward B. Haseltine, Edward Peace, M. D., John McCanles, Thomas Stewardson, M. D., Joshua Lippincott, Andrew D. Cash, Henry H. Smith, M. D., Ed. F. Drayton, M. D., J. Norris Emlen, John K. Kane, M. D., F. S. Seitzinger.

May 31. Jno. M. Foltz, M. D., U. S. N., Thomas Sparks, Samuel H. Williams, Oliver W. Barnes.

June 28. John B. Budd, Thomas Smith, John C. Davis, Alfred Horner, James S. Cox, Wm. P. Grier, M. D., Owen J. Wister, M. D., George W. Tryon, Jr.

July 26. Henry S. Schell, M. D., Nicholas H. Maguire.

Aug. 30. T. C. Downie, Thomas Y. Field, U. S. M. C., George W. Peterson.

Sept. 27. John T. Piggott, Miss Margaretta H. Morris, L. A. Frampton, M. D., H. St. George Hopkins, M. D.

Oct. 25. Capt. T. J. Cram, U. S. Top. Eng., John D. White, M. D., Richard M. Greenbank, M. D., Washington Townsend.

Nov. 29. Albert Fricke, M. D., S. S. White, Henry J. Feltus.

Dec. 27. James Postell, Brinton Coxe, John Welsh, Horace B. Fry.

The following persons were elected Correspondents, viz:—

April 26. Celedonio Carbonell, Porto Rico; Lewis M. Rutherford, New York; Brackenridge Clemens, M. D., Easton, Pa.

June 28. Prof. George Frauenfeld, Vienna; Charles Desmoulin, Bordeaux; Prof. Wm. Dunker, Hassel; Prof. Edward Swess, Vienna; Joachim Barande, Prague; Constantine von Ettinghausen, Prof Oswald Heer, Zurich.

Aug. 30. Wm. H. De Camp, M. D., Grand Rapids, Michigan.

Sept. 27. Henri de Saussure, Geneva; Edward Claparede, Geneva; Morris Hornes, M. D., Vienna; Johann G. Neumann, Gorlitz; Prof.

Edward Römer, Marburg; P. Flourens, Paris; Prof. George Jäger, Stuttgard; W. J. Hamilton, London.

Oct. 25. W. W. Wright, York Springs, Pa.

Nov. 29. G. C. Swallow, St. Louis, Mo.; Prof. W. P. Schimper, Strasburg; Thomas Rymer Jones, F. R. S., London; Prof. T. H. Huxley, F. R. S., London; Ch. J. F. Bunbury, London; Prof. Fred. Krauss, Stuttgard; Prof. C. F. Rammelsberg, Berlin; Ferdinand Römer, M. D., Bonn, Carl Theo. Von Siebold, Munich.

Dec. 27. Edward S. Morse, Portland, Maine.

CORRESPONDENCE OF THE ACADEMY, 1859.

Jan. 4th. From Captain A. Pleasanton, Fort Vancouver, Washington Territory, Nov. 22d, 1858, acknowledging his election as a correspondent of the Academy.

From I. L. La Porte, Bordeaux, November 2d, 1858, regarding exchanges.

Feb. 1st. From Prof. Christopher Johnston, Baltimore, January 23d, 1859, acknowledging his election to membership.

From Dr. Thomas B. Wilson, dated Newark, Del., Jan. 29th, 1859, tendering his resignation as a member of the Committees on Palæontology and the Library.

From Lieut. G. K. Warren, dated Washington, Jan. 18th, 1859, transmitting the maps acknowledged by the Librarian this evening.

8th. From S. W. Wilson, M. D., Darien, Ga., Jan. 31st, 1859, acknowledging his election to membership.

From K. K. Geolog. Reichsanstalt, dated Vienna, Nov. 10th, 1858;

The Acad. Royale des Sciences à Amsterdam, dated June 23d, 1858;

The Société des Naturalists de Moscou, dated June, 1858;

The Kongelige Danske Videnskabernes Selskab, dated Copenhagen, July 1st, 1858;

Societas Natura Artis Magistra, dated Amsterdam, March, 1858;

K. Sächs. Gesellschaft der Wissenschaften, Leipsic, July 18th, 1858, severally transmitting their publications.

From K. K. Geolog. Reichsanstalt, Nov. 30th, 1857;

Acad. Royale des Sciences à Amsterdam, Dec. 10th, 1857;

Zoolog. Botan. Verein, dated Vienna, March 15th, 1858;

K. Danske Videnskabernes Selskab, Copenhagen, July 1st, 1858;

American Antiquarian Society, Jan. 4th, 1859; severally acknowledging the receipt of the Publications of the Academy.

From Robert E. Peterson, Crosswicks, N. J., dated Feb. 3d, 1859, transmitting a note from Prof. Francis Lieber, of New York, accompanied by a letter from Humboldt, regarding the sale of the library of the late Prof. Müller.

15th. From the Minister of Public Works of France, dated Paris, Oct. 25th, 1858, transmitting the 2d part of Annales des Mines, 1858.

March 1st. From the Trustees of the British Museum, dated Jan. 29th, 1859, acknowledging the receipt of the publications of the Academy.

8th. From Wilson C. Swann, M. D., Philadelphia, Feb. 25th, acknowledging his election to membership.

15th. From the Society of Northern Antiquaries, dated Copenhagen, May 20th, 1858;

The Trustees of the New York State Library, Albany, Feb. 24th, 1859; severally acknowledging the receipt of the publications of the Academy.

22d. From the Lyceum of Natural History, New York, March 12th and 19th, acknowledging the receipt of the Proceedings of the Academy.

April 12th. From Mr. John Krider, dated Philadelphia, April 12th, acknowledging his election to membership.

From the Municipality of Bologna, dated March 22d, transmitting donations to Library.

19th. From the Royal Society of London, April 1st, 1859, acknowledging the receipt of the publications of the Academy, and advising that the Academy had been placed on the list of Societies entitled to receive the Proceedings of the Royal Society.

From Pottsville Scientific Association, April 13, 1859, acknowledging the receipt of the Proceedings of the Academy.

Dr. C. A. Helmuth, Chicago, June 6th, describing a monstrous specimen of Hydaticus zonatus, from the shores of Lake Michigan.

July 5th. From the Wiener Entomologische Monatschrift, June 8th, 1859, and Dr. Adolf Weiss, Vienna, Dec. 15th, 1858, severally transmitting publications.

From H. De Saussure, (no date) acknowledging the receipt of certain duplicates.

12th. From the K. Sichsische Gesellschaft der Wissenschaften, Leipsig, Feb. 14th, 1859;

Académie des Sciences, Arts et Belles Lettres de Dijon, Nov. 7th, 1858;

K. K. Geologische Reichsanstalt, Vienna, Nov. 25th, 1858;

Bataafsch Genootschap der Proofondervindelijke Wigsbegeerte, Rotterdam, March 7th, 1859;

K. Leopold. Carol. Akad. der Naturforscher, Jena, June 28th, 1859;

Naturhistorischer Verein in Augsburg, (no date);

Société de Physique et d'Histoire Naturelle de Genève, Nov. 20th, 1858;

Verein für Vaterländische Naturkunde in Württemburg, Stuttgart, Dec. 5th, 1858; severally transmitttng their publications and acknowledging the receipt of those of the Academy.

July 19th. From C. J. Hering, Surinam, June 16th, 1859, accompanying donations.

Aug. 2d. From Nicholas H. Riley, New York, July 30th, 1859, accompanying papers on Terrestrial Magnetism and Gold.

9th. From Mr. E. P. Wright, Dublin, regarding exchanges.

16th. From the Dublin University Zoological and Botanical Association, May 21st, 1859, acknowledging the receipt of the publications of the Academy.

23d. From N. Holmes, corresponding Secretary of the St. Louis Academy of Natural Sciences, July 6th, 1859, acknowledging the receipt of specimens.

From G. P. Fisher, Sing Sing, New York, July 26th, 1859, describing a fragment of the antler of a Reindeer, from a peat bed in that vicinity.

Oct. 4th. From E. Uricoechea, dated Bogota, Sep. 10th, announcing the formation of the Society of Naturalists of New Grenada, and desiring donations.

11th. From T. C. Downie, Brunswick, Geo., Sep. 30th, 1859, acknowledging his election to membership.

American Board of Foreign Missions, Oct. 5th, 1859, acknowledging the receipt of an invitation to visit the Museum of the Academy.

Geological Society of London, April 7th, 1859, acknowledging the receipt of the publications of the Academy.

18th. From Eli Bowen, Pottsville, Pa., Oct. 11th, offering for sale a collection of carboniferous fossils.

Nov. 1st. From Lingard A. Frampton, Charleston, S. C., Oct. 29th, acknowledging his election to membership;

E. Ferreira França, in the service of his majesty Don Pedro II., Emperor of Brazil, Leipsig, Nov. 10th, desiring exchanges;

F. A. Bockhaus, Librarian in the service of the same, accompanying the letter of Dr. França;

Royal Society of Sciences of Göttingen, May 23d, 1859;

K. Preussische Akad. der Wissenschaften, Berlin, April 12th;

Naturhistorischer Verein der Preussischen Rheinlande und Westphalens, Bonn, Feb. 10th, 1859; severally acknowledging the receipt of the publications of the Academy.

Société Impériale des Naturalists de Moscou, June 5th and 11th, 1859;

Senckenbergische Naturforschende Gesellschaft, Frankfurt-am-Main, June 9th, 1859;

Naturforschende Gesellschaft in Emden, June 22d, 1859, severally transmitting their publications.

CORRESPONDENCE.

...ellschaft für gesammten Naturwissenschaften. Marburg ... publications and acknowledging the receipt of

... in relation to his collection of carboniferous

... York Springs, Penna., Oct. 31st, 1859, acknowledgment.

... Sept. 22d, 1859, acknowledging his election

... Woodside, Pa., Nov. 21st, 1859, and from ... Oct. 15th, 1859, severally accompanying

... Geological and Statistical Society, New York, publications and desiring exchange.

... Philadelphia, Dec. 13th, acknowledging his

... Dec. 20th, declining to be considered a corresponding Secretary.

... History, Charleston, S. C., Dec. 15th, acknowledging ... of the Academy.

... der Wissenschaften, Leipsig, September, transmitting and acknowledging the receipt of those of the

... 30th, 1859, accepting a proposition for exchange.

PROCEEDINGS

OF THE

BIOLOGICAL DEPARTMENT

OF THE

ACADEMY OF NATURAL SCIENCES

OF PHILADELPHIA.

1859.

Reported by Dr. WALTER F. ATLEE, Recorder pro tem.

Dr. JOSEPH LEIDY, Director.

January and February.

I.—ANATOMY.

1. Dr. Hammond exhibited the stomach of a musk rat (*Fiber zibethicus,*) in order to show the peculiar glandular apparatus of the organ in this animal.

Dr. Hammond stated that having occasion recently to dissect one of these animals, he had observed a fact calculated to prove of interest to this Department.

On opening the stomach, a round spongy mass about an inch in diameter was found to occupy the pyloric extremity of this viscus. Upon subjecting it to microscopical examination, it was ascertained to be composed of a mass of tubules similar to those found in other parts of the stomach in the vertebrata generally. The whole secretory apparatus was concentrated in this mass, the remaining portion of the stomach being entirely devoid of any such arrangement, consisting simply of a rugous mucous membrane, the muscular layer, and the serous coat.

A somewhat similar construction exists in the beaver, (*Castor fiber,*) and is described by Cuvier in his *Anatomie Comparée.*

Dr. Hammond had also ascertained that in the genus *Arvicola* (embracing the common water rat,) the same formation and arrangement of the gastric tubules exists.

Dr. Hammond was not aware that attention had hitherto been directed to the structure of this peculiar formation in the animals in question, and hoped to be enabled to extend his researches on the subject.

II.—PHYSIOLOGY.

1. Dr. Mitchell exhibited a microscopical specimen of prismatic blood crystals obtained from the dried blood of the opossum, (*D. Virginiana.*) Dr. Mitchell also exhibited blood crystals obtained from the putrescent blood of the musk-rat, *Fiber zibethicus.* These crystals were rhomboidal tablets measuring a half to two-thirds of a millimetre in length. They formed spontaneously in a phial of blood which had stood in a warm room for five weeks, and was very putrid and of a most unbearable odor.

In connection with the first named specimen, Dr. M. referred at some length to the importance of the study of blood crystals in connection with the medico-legal study of the blood, and the examination of blood stains. Dr. M. remarked upon the difficulty of discriminating between the blood of man and that of some other mammals, even when the blood was comparatively fresh and fluid. Here, he thought, the blood crystal might serve to determine the point in question.

Usually in murder cases, only the dried blood was to be obtained, and here the possibility of making use of the varied forms of blood crystals to determine the source of the blood, was a more doubtful matter. Several questions present themselves.

Can blood crystals be obtained from the dried blood of man and animals? Dr. M. has so far been unsuccessful in obtaining the characteristic form from dried human blood. Some of the German observers have been more fortunate. The failure to obtain the human blood crystal is not, or would not be, decisive as to the inutility of this mode of research, if the blood of other animals does not present a like difficulty. On this point, our information is not altogether complete, because the number of animals whose blood has been examined, is as yet rather limited. The blood of birds, whether in its wet state, or dried, has not afforded crystals under any method as yet employed. This is unfortunate as regards judicial questions, because it is often a question whether a blood stain may not have been derived from pigeon or chicken blood. Dr. M. referred to such a case as within his own experience.

The blood of fishes in general affords crystals with great readiness, even after the blood has been long dried. The forms are characteristic, and are not likely to be confounded with those of human blood.

The blood of all reptiles is difficult to crystallize. Dr. M. would say, after many trials, impossible, were it not for the results which others have observed. At all events no observer has obtained crystals by treating the dried blood of reptiles, nor is it likely that the blood of this class will ever play any part in a judicial investigation. In regard to birds, fishes and reptiles, it is to be observed that the form of the blood globule, and its nuclear condition, may be decisive as to its not being human, and that the production of blood crystals from the blood of these classes is not, therefore, so important as in the case of mammalia, and especially of the domestic animals. In some of these, as the cat, the blood affords good crystals when properly treated, either in a fresh state, or still better when decomposing. Dr. Mitchell was unable to obtain crystals by treating the dried blood of the bullock or sheep, but he obtained crystals easily from the dried blood of the opossum, and from several of the rodentia. It is probable that we shall be able at some future time to obtain crystals from the dried blood of any animal.

Dr. M. especially insisted on the greater ease with which putrescent blood yielded crystals. He thought that exposure to light and the decomposition of the blood, previous to its being dried, were the most favorable conditions. The disappearance of the fibrinous mass under these circumstances, placed the process of crystallization in the best circumstances by setting free the mass of blood globules. Dr. Mitchell was accustomed to obtain crystals from dried blood by moistening the dried clot and occasionally supplying water until putrefaction began, when the blood was treated as though it was fresh.

The blood thus moistened was examined for crystals by the usual method from day to day, but the best results were commonly observed at the period of decomposition.

Dr. Mitchell's remarks gave rise to an animated discussion of the medico-legal examination of blood stains.

Dr. Woodward was of opinion, that it generally is impossible to state the particular mammal from which the blood of a dried blood stain has come, by any mode of microscopic inspection. Dr. Schmidt had constructed tables of

the relative size of the "dried blood globule in man and many animals." Dr. Woodward thought too much stress had been laid upon these measurements, and conceived, that a question which it was very difficult to answer in regard to fresh blood, must become almost unanswerable with dried blood. He had himself been examined in a case where those concerned evidently expected that the microscope would enable him to say of the specimen of dried blood, this is the blood of man, or of this or that mammal. He had found himself unable to decide, and had stated as his fixed opinion, that no examination by the microscope of the blood globules fresh or dried and remoistened would enable any one to swear as to the source of the specimen. He mentioned this, because in this city and elsewhere other opinions are held and taught by many medical men.

Dr. Leidy stated his opinion to be the same as that held by Dr. Woodward. He would feel it to be very unsafe to declare positively to what particular animal certain blood corpuscles belonged. He alluded also to cases where, when judicially examined, he had been obliged to correct erroneous opinions similar to those spoken of by Dr. Woodward.

Dr. Hammond agreed entirely with the opinions held by these gentlemen.

Dr. Hartshorne stated that he had come to the same conclusion as to the impossibility of deciding positively as to the source of blood stains, with or without the use of the microscope.

Dr. Hammond declared that in only one class of cases did he believe that the microscope could be of any service; it would enable the physician to pronounce with confidence that certain stains did not come from the blood of a human being when the corpuscles contained therein were oval or nucleated.

Dr. Atlee stated that he had never observed any white corpuscles in specimens of dried blood. Drs. Leidy and Hammond added the remark, that, as far as their recollection served, they had not observed them.

Dr. Woodward declared that he had seen them very distinctly after six months had elapsed, when blood had been dried rapidly on a slide.

This difference of opinion was attributed by Dr. Morris to not using oblique lights, by which these bodies are much more readily distinguished.

2. Dr. Hammond read a paper entitled "*Observations on the Colorless Blood-corpuscles*," which was referred to a committee.* From a series of experiments Dr. Hammond was led to infer that the white corpuscle is not so persistent in dried blood as the red disc, and therefore not so capable of affording reasonable indications as to the presence of blood as the latter.

III.—Pathology and Pathological Anatomy.

1. Dr. Leidy exhibited specimens of a Trichina found in the muscles of a human subject. He stated that he often meets with this parasite, and, most frequently, in the biceps muscle of the fore-arm.

2. Dr. Mitchell described a gall-stone found in the gall bladder of a musk-rat. It was a soft, amber-colored mass, dissolving readily in hot alcohol. As to the exact nature of this substance he was not determined; it was not, however, either bile, pigment, or cholesterine.

Dr. Uhler, as the result of very considerable study of organic substances, stated he was inclined to believe that many bodies, described as such, are never found in the organism during life, but are the product of chemical manipulations. Moreover, he wished to lay stress upon the point that when vitality

*See American Journal of the Medical Sciences, April, 1859.

leaves any substance, as, for instance, albumen, it loses something it had before, and is no longer the same. In his opinion, bile in the gall bladder is not bile in the chemist's capsule.

3. Dr. Mitchell stated that in a case which had recently occurred to him after the death of the mother from phthisis, the abdomen was opened three quarters of an hour after her death, and the child, a well developed infant, was found dead and perfectly rigid. He believed the child to have died some time before the mother, from the fact that *rigor mortis* does not occur so soon as the time mentioned in well nourished bodies.

In connection with this subject, Dr. Darrach recalled the ease with which, in some persons, the cutis could be made to rise into weals like those of urticaria.

Considerable discussion ensued as to the interpretation of the phenomena above mentioned, and as to the amount and situation of the non-striated muscular fibre in the skin.

4. Dr. Hammond exhibited the liver of a rabbit (*Lepus domesticus*) containing an immense number of eggs of a parasite. The liver was enormously enlarged, and to the naked eye its whole tissue appeared to be supplanted by granular masses contained in cysts; these bodies when examined by the microscope were seen to be composed of numberless oval cells, containing a distinct nucleus —the yolk. Attached to the liver and hanging in the peritoneal cavity were several masses of hydatids, no tæniæ or other parasites were found in the stomach or intestines. Eggs of the same character as those above referred to were found by Dr. H. in the spleen.

Dr. Hammond also alluded to the constant occurrence of entozoa eggs in the spleen of Chelonian reptiles. In a considerable number of specimens of Emys guttata, Emys terrapin, Emys insculpta, and Emys picta which he had dissected, he had never found these bodies absent from the spleen. Drawings of these eggs, as also of those found in the rabbit, were exhibited.

Dr. Hammond also referred to the common opinion that the lower animals were but little subject to disease. This idea he regarded as erroneous, and thought that the numerous examinations now made of all classes of animals, would soon demonstrate that man is proportionately much less liable to disease than is generally supposed.

5. Dr. Leidy exhibited a specimen of human muscle containing numbers of the peculiar cysts described by him in a former number of the American Journal of the Medical Sciences. These cysts appear not to contain entozoa or their eggs. He had also frequently observed them in the skin. They were irregularly stelliform, and consisted of a fibrous investment enclosing numerous extremely small granules.

Dr. Woodward stated that he had been requested to examine these bodies, and that upon so doing microscopially he was able to confirm Dr. Leidy's opinion of their structure. The minute granules were insoluble in ether, and therefore if consisting of fat were probably enveloped in an albuminous coat.

March.

I.—Anatomy.

1. Dr. Packard called attention to the structure of the swimming bladder of the Gar Pike (*Lepidosteus*) recently caught in the Delaware, and exhibited a portion of the wall. The inner surface of the air bladder of the gar fish recently dissected, presented an arrangement closely resembling that of the heart; viz: papilliform muscles, or *columnæ carnæ*, arising from the wall, and fastened by fine tendinous cords to the edges of tendinous valves, likewise connected with the wall of the bladder.

Between these structures the surface of the wall displayed ridges of mus-

cle running in various directions, the result of their actions being to diminish in all directions the calibre of the organ. The muscles first alluded to had their attached ends towards the caudal extremity of the fish, and ran nearly parallel with the axis of the body: their length, not including the tendons, was about ½ inch, or less.

Under the microscope, fully-formed striated muscular fibre was observed in these structures. The fibres measured about 1-1350th of an inch in diameter, and the ultimate fibrillæ were very coarse. In the heart, the muscular fibres measured about 1-1200th of an inch, but their ultimate fibrillæ were much more delicate.

Dr. Packard was at some loss to recognize the use of this peculiar structural arrangement. Dr. Hammond had examined many fishes, but had never met with striated muscular fibre in this organ. Dr. Mitchell thought that the great rigidity of the scaly covering on this fish might render necessary some additional means of contracting the air sac. He thought the question as to how it was filled a more difficult one. The gar can have no suctorial power, and the air sac is surmounted by a glottis admirably calculated to exclude the air. Dr. Hammond called attention to the degenerated state of the muscular tissues of this specimen. They were more or less converted into fatty matter, and this was especially the case in the muscles of the belly.

Dr. Mitchell described the peculiarities of the circulatory apparatus of the gar pike. In this fish a hepatic vein and a vein from the muscles of the left side open at the same point into the auricle; a third vein from the muscles of the right side opens into the auricle by a separate orifice. The mouths of all these veins are provided with more or less perfect valves, whose edges are attached to the walls of the auricle by tendinous cords and muscular columns. The auricle is very large and easily dilated. The auriculo-ventricular opening has a short fringe-like valve which extends around two thirds of the aperture. The ventricle is small, and very thick. In the specimen examined, no distinct valves could be seen at the orifice through which the ventricle delivers its blood into the bulbus arteriosus, nor were there any valves such as are usually found in the arterial bulb itself. The interior of this organ was furnished with six rows of projecting wart-like prominences, each of which was connected with the one above and the one below, in the same row, by delicate and numerous tendinous filaments whose office it was difficult to comprehend.

II.—Physiology.

1. Dr. Mitchell drew the attention of the Department to a peculiar contraction which is produced when a blow is struck over any of the muscles which are not very firmly bound down by fascia.

Dr. Stokes of Dublin, long ago observed that when he percussed the skin over the pectoralis muscle, its fibres contracted responsive to the stimulus of the blow. While percussing certain consumptive patients, Dr. Mitchell noticed that as the bar of muscle ceased to contract, a second contraction took place nearly at right angles to the first one. By it the skin was raised into a prominence, some lines in breadth and rather longer than the space covered by the percussing finger end. This secondary contraction so slowly disappeared that it seemed to be due rather to the action of organic non-striated muscle, than to the striated variety of which voluntary muscles are composed, and which is habitually rapid in its mode of contraction and of relaxation. Further observation showed Dr. Mitchell that a large part of the muscles, which are neither deeply, placed or firmly bound down by fascia, are able to exhibit both of the forms of contraction here alluded to. Thus the extensor muscles of the leg and arm are not very susceptible to this form of direct stimulus, while the flexors and most of the muscles of the trunk, both before and behind, can be made to exhibit both forms of contraction by tapping them smartly and quickly with the finger

point of a percussion hammer. The primary contraction, or that which involves the whole length of a fasciculus of muscle. is best seen when we strike upon the region of the pectoralis major or that of the gluteus maximus. The secondary and local contraction is best developed by percussing the pectoral region, and the skin which covers the infra spinatus scapular muscle. Illustrations of the phenomena in question are so frequently within reach of the members that Dr. M. did not consider it necessary to describe them more fully.

Several circumstances had already convinced Dr. Mitchell that the secondary contraction, described by him, was not due to the action of the non-striated muscle of the skin. A very obvious and simple experimental test at once referred the phenomenon in question to its proper source,—the voluntary muscles beneath the cuticle.

A small rabbit was rendered insensible by the aid of chloroform, and the skin was removed from the chest so as to expose the surface of the pect. major muscle. Upon striking the muscle with a scalpel handle or any blunt body, two distinct reactions ensued.—1st. The fasciculus of muscle which was stretched by the blow, instantly and rapidly contracted and relaxed. As the relaxation took place, a local contraction occurred at the point struck, so that a small portion of the muscle could be seen to gather itself into a little mound, which again disappeared within from twenty seconds to half a minute. Both phenomena, then, are due to the contractibility of voluntary muscular fibre. Dr. Hammond, who had witnessed the experiment, and who had also seen the phenomenon in question, agreed with the explanation given by Dr. M.

2. Dr. Hammond stated that having had occasion recently to vivisect a bat, (V. novaboracensis) he had observed that the heart continued to beat for some minutes after the chest was laid open. Upon seizing the organ with a pair of forceps a short distance above the orifice of the larger vessels, and severing the connection of the heart by dividing these above the place where they were compressed, pulsation still continued both in the auricles and ventricles for a minute and a half. At the end of that period the heart ceased to act, and could not be re-excited by pricking it with the point of a needle. On opening the forceps so as to allow a little blood to escape, pulsation recommenced and continued for about a minute. It then ceased and could not be excited by irritation. A little more blood was then suffered to escape, and pulsation immediately followed, continuing for several seconds. The same thing was repeated two or three times with a like result, until all the blood had flowed out. The heart then remained perfectly quiescent; its irritability was entirely gone. Dr. Hammond regarded this experiment as tending to disprove the hypothesis that the blood is the excitor of contractility in the heart.

III.—Pathology.

1. Dr. Atlee exhibited a vesicle from an *Hydatid Mole*, mounted in a slide for convenience of examination under the microscope. The specimen came from a patient who was enormously swollen, with albuminuria to a very high degree, and vomitings smelling most offensively of urine. Although but four or five months gone in her pregnancy, the uterus was above the umbilicus. The mass which was spontaneously discharged from the uterus was about as large as the head, and almost entirely similar to the specimen presented. A small part, perhaps as large as two or three fingers, presented the usual color and consistence of the placenta, while all the rest was colorless and of the consistence of ordinary gelatine. All this latter portion was divided into grape-like masses of vesicles full of liquid, varying in size from a pin's head to that of an ordinary marble. There was no vestige of an embryo.

These moles are caused by what might be styled dropsy of the villosities of the chorion. The villosities of the chorion are hollow and composed of a large pedicle, from which a trunk proceeds that is subdivided into many branches. Each one of these ramifications terminates in a cul-de-sac. These moles are

formed by dilatations of the ramifications filled with fluid, taken, of course, by imbibition from the uterine caduca. This condition of things is recognizable not only from the exterior aspect of the mass, but on examining one of these grape-like bodies under a microscope, the same peculiar amorphous substance, with nuclei and granulations interposed, is seen, that characterises the villosities of the chorion.

It is worthy of mention that this is the second time this woman had this same *false conception*, as it is termed.

Dr. Woodward read a paper entitled "*On Suppuration in Cancerous Growths.*" After stating that many of the purulent looking fluids found in connection with cancers were not *pus*, but *softened cancer matter*, this paper proceeded to detail a minute anatomy of a case of ulcerated cancer of the breast, in which a true pus was discharged from the ulcers.

Attention was called to the absence, in this and in many other cases, of the train of peculiar symptoms designated as the cancerous cachexia, and the probability was hinted that these phenomena (as distinct from mere exhaustion by suppuration or hemorrhage,) might, perhaps, bear less relation to cancer *per se*, than to cancerous infiltration of certain internal organs.

In connection with the minute anatomy of the tumor, various doctrinal points were discussed. Especially were the phenomena of suppuration in cancer, as here noted, regarded as confirming the doctrine of the homology of cancer with new formations of connective tissue, and as antagonistic to a *purely* humeral view of the pathology of cancers.

The paper will be published in full in the *American Journal of Medical Sciences.*

April.

I. Pathology.

1. Dr. Morris presented to the Department, a human embryo, accompanied with its membranes. The membranes were developed as much as they generally are at two and a half months. The embryo itself appeared to have been arrested in its development at one and a half months. The chorion and amnion were separated by effused blood, which was also found beneath the coverings of the fœtus and immediately around it.

2. Dr. Leidy called the attention of members of the Department to specimens on the table of three kinds of dipterous larvæ from man. As he had not made the flies an especial subject of investigation, he could not say postively to what genera and species the larvæ belonged.

No. 1, of which there are seven specimens in the vial, appear to be the larvæ of the Blue-bottle fly. They are part of a number which were given him by a physician, and had been vomited from the stomach by a child.

These larvæ are half an inch in length, and 1½ lines at the broadest part; elongated conical, anteriorly acute, posteriorly obtuse; everywhere minutely shagreened; anterior articuli strongly marked; posterior ones with a transverse row of minute papillæ becoming obsolete anteriorly. Head bipapillate, with a pair of hooks projecting from the mouth. Succeeding articulus with a spiracle on each side. Caudal articulus with an elliptical pit margined with a corona of conical tubercles, and having at bottom a pair of large spiracles. Anal aperture bounded on each side with a large trilateral wart, and posteriorly with a transverse crest terminating at each end in a conical tubercle.

No. 2, of which there are five specimens in the vial, appear to be the larvæ of a species of *Anthomyia* or Flower-fly. These are part of numerous specimens, which were given to him for examination, by a physician who had obtained it from his own person. He had been seized with all the symptoms of cholera morbus, and in the discharges he had detected numerous specimens of this, to him, unknown parasite. It was in the latter part of summer; and the larvæ, it is suspected, had been swallowed with some cold boiled vegetables.

The larvæ are from three to three and a half lines long, and from one to one and a quarter lines broad; demi-elliptical; articuli strongly marked, everywhere minutely shagreened; body anteriorly subacute, posteriorly obtuse. Head bipapillate, with a pair of hooks projecting from the mouth. Articuli furnished dorsally and laterally, each with six long, posteriorly divergent, flexible, compound spines; ventral segments transversely subdivided, the posterior subdivision furnished with a transverse row of papillæ. Caudal articulus dorsally sloping, furnished with a pair of prominent spiracular tubercles, and fringed with six spines. Anus ventral.

The same larva Dr. L. had observed in another case, accompanied with the ordinary phenomena of cholera morbus.

No. 3, of which there are nine specimens in the vial, are of especial interest, as being the larvæ of a Bot-fly obtained from man. These specimens were procured by our friend, the accurate naturalist, Dr. Le Conte, during the summer of 1857, in Honduras, Central America. They are part of a larger number of specimens obtained by Dr. L. from his travelling companions. Dr Le Conte had not observed the perfect insect, nor was it known when the latter deposited its eggs. The larvæ were usually found beneath the skin of the shoulders, breast, arms, buttocks, and thighs, and were suspected to have been introduced when the persons were bathing. Thomas Say was the first to describe the larva of a bot-fly from man; the specimen having been taken by Dr. Brick, from his own leg, while in South America.

Recently, Keferstein (Verh. d. Zool. Bot. Vereins, vi, 1856, 637) has prepared an elaborate essay in which he discusses the question as to the existence of a true *Oestrus hominis*. The result of the discussion appears to be that the latter does not exist, but that the oestrus larva obtained from man is that of the *Cuterebra noxialis*, which is especially obnoxious to domestic cattle.

The specimens of larvæ of Dr. Le Conte, however, appear to differ from those generally referred to by Keferstein, but agree with that described by Say, and are not like those described and figured by Goudot, in the An. d. Sc. Nat., 1845, Zool. iii., 221.

According to F. Müller, quoted by Keferstein, the deposit of the egg of the bot-fly in man is very painful. Dr. Le Conte informs us that his companions were not aware of the time when the eggs of the larvæ obtained by him were deposited in their body. He also states the presence of the larva gave rise to comparatively little uneasiness.

These larvæ are from two and a half to five lines long: clavate, incurved; anteriorly ovate, from three-fifths to one and a half lines wide; posteriorly cylindro-conical, from one-fifth to half a line wide. Head bipapillate, with a pair of hooks projecting from the mouth. Succeeding three articuli covered with minute, black, uncinate spines; the next three articuli each provided with large, black, conical, uncinate spines, with a broad striated base and the sharp apex directed backward, arranged in a double row dorsally and forming a single row ventrally. Remainder of the body abruptly narrowed, indistinctly articulated, and smooth, except the last pair of articuli, which are separated by a constriction, and are covered with minute recurved black hooks. The last articulus is oblate spheroidal, enclosing a pair of spiracles and the anal aperture bounded by a pair of papillæ.

Dr. Leidy further called the attention of the Department to a drawing of pus-like corpuscles, which he had obtained from an abscess in the adductor muscle of an oyster. The corpuscles were spherical, granular, and nearly uniform in size. Acetic acid rendered them paler; did not evolve a compound nucleus, but rendered evident one or two isolated oil-like nuclei.

1. Dr. I. I. Hayes read a paper entitled *On the Relations existing between Fora and the capacity of Man to resist low Temperatures.*

This paper was recommended for publication in a Medical Journal. The following is an abstract of the contents:

II. Hygiene.

Dr. Hayes stated that during the late cruise of the Advance to the Arctic seas, his attention was directed to some facts in relation to the capabilities of men to resist low temperatures, which, at the friendly suggestion of Dr. Hammond, he had grouped together, and, with permission, would submit them to the Department.

He thought that there was a great misapprehension existing in the popular mind upon the subject of Arctic life, it being generally thought that Arctic travellers were necessarily subjected to great hardships, in consequence of the lowness of the atmospheric temperatures. This he could but consider a great mistake. The animal economy everywhere adapts itself with greater or less facility to surrounding circumstances, and this power of adaptation is no where more strikingly exhibited than in the Arctic regions. The appetite and digestive powers are doubtless more intimately concerned than any other of the animal functions, and, in the quantity and quality of the food consumed we are led to look for an explanation of the cause which enables the inhabitants of Polar countries so successfully to resist the cold.

The Esquimaux, with whom he had had communication in the far North, were found living mainly without fire. They have no wood, and no means of creating an artificial temperature, except with a small lamp, using blubber for fuel and moss for wick. The flame of this lamp gives very little heat, and is barely sufficient to melt from the snow the water which they require, and to light their huts during the dark period of the winter. During the coldest season they often live in snow-houses, the temperature of which ranges from zero to the freezing point, being kept thus elevated above the temperature outside, which ranges from —30° to —70°, chiefly by the heat radiated from the persons of the occupants; yet, with this seemingly unendurable temperature they appear to live in comfort. They do not hesitate to expose themselves to any degree of cold, when engaged in hunting, and often sleep upon the snow, with no other protection than a piece of bear skin, on which they lie. Nevertheless, these people are strong, robust and healthy. Scurvy is unknown amongst them, and Dr. Hayes had never heard of, or seen, a case of tubercular disease.

Dr. Hayes thought that we must look for an explanation of this wonderful power of resistance to the character of their food. They subsist entirely upon an animal diet, the flesh mainly of the walrus, seal, narwhal and bear; and the quantity which they consume seems really enormous. He had frequently seen an Esquimaux hunter, when preparing for a long chase, eat from six to twelve pounds, at least one-third of which was fat, and he would place the daily consumption of the men at from twelve to fifteen pounds. In this large consumption of animal food they find their shield against the cold, and he does not believe that they could live upon a vegetable diet under such exposure. The same laws govern the Esquimaux and the white men, and just in proportion as the crew of the Advance accustomed themselves to the diet of the natives, did they gain power to expose themselves with impunity to low temperatures. They found themselves continually craving animal food, and especially fatty substances. The process of acclimation went on in proportion to their ability to eat and digest this kind of diet. During the early part of the cruise, they suffered much from temperatures, which, at a later period, produced no impression whatever upon them.

Dr. Hayes thought it was worthy of more than a mere passing remark, that scurvy and strumous diseases were unknown to the natives of the region, so far, at least, as his observations extended. In relation to the last, he would merely submit the fact: with regard to the former, he would say that wherever scurvy has occurred in the Arctic regions, it has been owing to accidental causes, which experience has taught us to remove or avoid. The long continued use of a salt meat diet had much to do with its development, and, as

accessories, the cold, darkness, and excessive exertions. There is now, however, no necessity for the use of such a diet, and with abundant supplies of fish, animal food, and especially of fat, the last mentioned predisposing causes of disease ceased to have existence. Dr. Hayes thought that it was owing to their weakened condition, resulting from the use of salt food,—of which they could eat only small quantities,—allowing the cold and darkness to prey upon them, that an *epilepto-tetanoidal* disease exhibited itself amongst the men of Dr. Kane's command, and affected similarly their dogs.

While fresh animal food is absolutely essential to the inhabitants of Arctic countries, Dr. Hayes considered alcohol in any shape not only useless but positively injurious; and in this opinion he was fully sustained by the experience of the enterprising and indefatigable traveller, Dr. Rae, whom we had recently the highly gratifying opportunity of welcoming to the Academy. On the other hand, tea and coffee are most useful; and he found himself at a loss to say which is best. The English and Russian's prefer tea, while Dr. Kane's men took most kindly to tea in the evening when retiring, and coffee in the morning when preparing for a day's journey.

In relation to the animal diet used by the Esquimaux, Dr. Hayes observed that they eat it chiefly uncooked and frozen. This fact had been useful to him, and he would suggest it to his brethren of the profession as having, perhaps, some importance. He had frequently found that stomachs of scorbutic patients, which rejected cooked meats, would readily take raw meat in this state, or, as they expressed it, "cooked with frost." By this process the repulsiveness of the uncooked flesh is entirely destroyed.

Dr. Hayes said, in conclusion, that he submitted these facts to the Department without comment, leaving for those better qualified to determine as to whether they threw any new light upon the highly interesting and important physiological questions which they involve.

May.

I.—Pathology.

Dr. Packard read a paper "*On the Pathological Relations of Cancer and Tubercle,**" of which the following is an abstract:

There are several ways of accounting for the property called *malignancy*, so commonly attributed to these formations.

1. A new element may be supposed as formed in or entering the blood, and to be eliminated as if by a gland.

2. The new growth may be considered as the starting point, infecting the system by a sort of radiation.

3. It may be assigned to a mere deterioration of the nutritive material.

4. Some abnormal element may be imagined, determining an erratic development of tissues not themselves essentially abnormal.

The subject is capable of some elucidation from clinical history as well as from morbid anatomy.

I. Under the head of etiology must be considered

(1). *Predisposing causes:* (*a*), Inheritance; (*b*), Age; (*c*), Sex; (*d*), Complexion; (*e*), Residence in the city or country; (*f*), Occupation; (*g*), Depressing influences.

(2). *Exciting causes:* (*a*), Mental or other depression; (*b*), External violence; (*c*), Contagion.

(II). Under the head of symptomatology, all the phenomena occurring in the course of these diseases must be considered.

(*a*), Seat of disease; (*b*), Mode of attack; (*c*), Duration; (*d*), Amount and

* See American Journal of the Medical Sciences, July, 1859.

kind of pain; (*e*), Mental state; (*f*), Hectic fever; (*g*), Formation of humors; (*h*), Modes of termination; (*i*), Convertibility; (*j*), Coëxistence.

The relations of cancer and tubercle to other growths may be readily summed up.

(III). Under the head of morbid anatomy may be mentioned (*a*), The theory of special anatomical elements, characteristic of cancer and tubercle.

(*b*), The theory that those elements are analogous to, or identical with certain normal elements of the body.

This latter theory is, perhaps, the most convenient, but there are some very strong arguments against it, mainly derived from the preceding considerations.

The object of this discussion has been to show that at the present time the material at command is not sufficient for the establishment of any general law, but that we must endeavor to accumulate evidence both from clinical observation and from minute anatomy, until some definite conclusion presents itself.

II.—Physiology.

Drs. Hammond and Mitchell read a paper entitled "*Experimental Researches relating to Corroval and Vao, two new varieties of Woorara, the South American arrow poison.*"*

After detailing the history, mode of preparation, physiology and chemistry of the woorara, the authors state their own experiments with the two new varieties of this poison, obtained by Drs. Ruschenberger and Caldwell of the United States Navy, from the Rio Darien, South America, and given to them by Prof. Carson of the University of Pennsylvania.

From these substances they obtained an alkaloid possessing when administered in exceedingly small doses, all the power of the corroval or vao. The corroval yielded a much larger per centage of this principle than the vao, which accounts for the greater activity of the former. This alkaloid is uncrystallizable, but forms salts with many of the acids. When pure it is of a very light green hue, somewhat resembling tannin in appearance. It is intensely bitter.

For this alkaloid they propose the name of *corrovalia*.

Numerous experiments were made with the corroval and vao, from which the authors deduce the following conclusions:

Corroval.—1st. That it differs essentially from any variety of woorara hitherto described, both in its chemical constitution and physiological effects.

2d. That it acts primarily upon the heart, through the medium of the blood, producing an arrest of the action of this organ.

3d. That it produces a cessation of the movements of the lymph hearts in from twenty to thirty minutes after its introduction into the circulation.

4th. That the annihilation of voluntary and reflex movements is a secondary result of its action, depending primarily upon the discontinuance of the functions of the heart.

5th. That it acts upon the nerves from the periphery to the centre, and abolishes both the sensory and motor functions.

6th. That it destroys muscular irritability.

7th. That it paralyzes the sympathetic nerve, this being one of the primary effects.

8th. That it is absorbed both from the intestinal canal and skin of frogs.

9th. That its poisonous qualities are due to an alkaloid hitherto undescribed.

Vao.—1. Vao, either in a solid, or more quickly in a liquid form, can be absorbed from the areolar tissues of cold-blooded animals, as the frog.

2. It is also absorbed, if in solution, by the stomach, œsophageal mucous membrane, rectum, and skin, with a degree of rapidity which varies, and is rapid or slow as the animal is well supplied with water.

3. Warm-blooded animals absorb vao from the stomach and intestine when

* See American Journal of Medical Science, for July, 1859, for this paper in full.

they are fasting, but suffer no ill effects when the vao is given during digestion. That this protection is not due to a mere mixture of the vao with the food of the full stomach, is shown by the fact that rabbits, whose stomachs are always more or less distended with food, are protected only when owing to the entry of fresh food, digestion becomes active.

4. The demands of the system for water do not affect to any perceptible extent the absorption of vao from the stomach of the rabbit.

5. The circulation of the frog is arrested within from ten minutes to one hour by the introduction of vao under the skin. The same result obtains within from twenty-four to forty-eight hours, when the poison is swallowed in small doses.

6. The first effect of vao is to increase the force of the heart without increasing the number of its pulsations.

7. The next effect is a paralysis of the muscular tissues of the heart, so that the ventricle stops first, and the right and left auricles next, in the order in which they are named. In a majority of the frogs poisoned by vao, the heart remains galvanically irritable for a certain time after the organ has ceased to pulsate.

8. The heart stops before the voluntary motions are at an end, in all cases of rapid poisoning. When poisoning occurs by absorption from a mucous surface, the phenomena march more slowly, and voluntary control and reflex power are both lost before the heart has entirely ceased to beat.

9. Vao stops the respiration in warm-blooded animals by arresting the circulation, and so paralyzing the nervous system, without which respiration is impossible, so that the checked respiration is a consequence and not a cause of the injury to the cardiac functions.

10. In the batrachia also, the respiratory movements cease before the heart has entirely lost the power to pulsate.

11. In the alligator poisoned by vao the respiration is perfect some time after the heart is at rest.

12. The facts last quoted and the inability of artificial respiration to restore or sustain the cardiac movements in warm-blooded animals poisoned by vao, prove sufficiently that the first effect of the poison is upon the heart, and that the appearances of asphyxia observed post-mortem in rabbits, cats, etc., are of secondary importance so far as concerns the cause of death.

13. The temperature of warm-blooded animals poisoned by vao falls with considerable rapidity, and does not undergo any elevation after death.

14. The nerves of sensation first lose their power to convey impressions—the motor nerves are next affected. The paralysis of the nerves extends from the periphery to the centre. The affection of the nervous system may be due to the sudden arrest of the circulation, and not of necessity to the direct influence of the vao. The irritability of the voluntary muscles in the frog is lost much earlier than is the case when the animal dies by decapitation.

15. The sympathetic nerve is paralysed, at least in the upper portion of its distribution, before the nerves elsewhere have lost their functional power.

16. The ciliary motion is unaffected by the use of vao.

17. The blood of animals thus poisoned coagulated as usual, and had not lost the power of changing color when exposed to oxygen or carbonic acid.

18. So far as we are aware, no true physiological antidote exists for vao poison, since even artificial respiration fails to sustain life in animals affected by it.

19. The vao poison closely resembles corroval in its physical, chemical, and physiological reactions. The alkaloids extracted from the two poisons produce in animals of equal size effects which cannot be distinguished.

20. We, therefore, are inclined to consider vao as merely a weaker variety of corroval, and to conclude that the apparent difference in the effects produced by the original extracts is due to a difference in their strength.

June.

I.—PHYSIOLOGY.

A paper was read entitled "*An Experimental Examination of the Physiological effects of Sassy-Bark, the ordeal poison of the Western Coast of Africa;* by S. Weir Mitchell, M. D., Lecturer on Physiology in the Philadelphia Medical Association, and William A. Hammond, M. D., assistant Surgeon U. S. A.*

The following is an abstract of this paper:

Sassy-Bark is derived from a tree described by Prof. Procter as Erythrapleum Judiciale, and in the Gardener's Dictionary of Mr. George Dow, as E. Guineense.

The bark occurs in pieces four inches and upwards in length, and half an inch in thickness. It is of a deep red color, a slight odor and a marked astringent, taste due to tannic acid. Both alcohol and water extract its active principles. Mr. Procter failed to obtain from it any crystallizable alkaloid. The preparations used by us were the dry alcoholic extract—the alcoholic tincture.

The effects of sassy, when used as an ordeal poison, have been described by Wilson, Winterbottom, Beecham and Christison, and are fully detailed in the paper of which this is an abstract.

The bark is given in aqueous infusion to the suspected person, who is required to drink large quantities, (several pints). If it produces emesis the person is esteemed innocent; but if he becomes giddy or confused, he is considered guilty and is put to death.

The sassy employed by us was first given to animals, and was finally taken in considerable amount by the authors of this paper.

As is usual in such examinations, frogs were first employed to test the peculiar characters of the poison.

Experiment. A large frog received under the skin of his back one drachm of the tincture, previously warmed to drive off the alcohol. At the close of two hours he had become very sluggish, and indisposed to move. He continued in this condition during twenty-four hours, and then gradually recovered.

Experiment. A frog received a similar dose in the same manner. His heart was then exposed, and attentively watched. It became more feeble as the frog became sluggish, but no alteration in the number of its pulsations was observed. In the course of two or three hours the frog became extremely torpid, but was still able to move when roughly irritated. A second frog, which received 1/3 of the evaporated tincture in his back, and three grains of the extract in his stomach, became inert like the others, but at the close of forty-eight hours was again active, and on being replaced in water was well two days later.

Still larger doses were tried upon other frogs, with so little result of interest, that we turned at length to warm-blooded animals for more satisfac'ory and definite conclusions.

Experiment. A large rabbit took internally twelve grains of the dried extract. Within an hour he became languid. At the close of two hours he would remain in any strange position in which he might be carefully and gently placed. He could be laid upon his side, or seated on his gluteal muscles in the corner, without an attempt to escape or resist. If disturbed while in these strange postures, or if placed in them suddenly and roughly, he instantly recovered his activity, and sought to escape, although his efforts were characterized by a certain languor and difficulty which brought him to rest again almost immediately. There was, at this period, no change in the pupils. His sensibility was thought to be diminished, since his skin could be pinched sharply without eliciting any expressions of pain. Six hours later no change was perceptible. He was motionless, unless disturbed, when he moved a few steps and then

* See the Charleston Medical Journal and Review, for November, 1859.

stopped again, and remained with his head couched on his fore paws. He declined food, but drank a little water. Seventeen hours later he was found dead. His urine contained neither sugar, albumen, nor the coloring matter of the sassy. His stomach contained a mass of hay, lettuce, etc., as is usual with rabbits, whose stomachs are never quite empty. The coloring matter of the sassy seemed to have disappeared, and there was not the least evidence of inflammatory action in the stomach or intestines. The heart was large and relaxed, the right cavities containing most blood. The blood vessels of the meninges of the brain were considerably injected, but no other abnormal appearances presented themselves.

Experiment. A small doe rabbit received under the skin of her back eighty drops of the tincture of sassy, previously warmed until it scarcely retained any odor of alcohol, and was thick and turbid. At the same time forty drops were given internally. At the close of half an hour, she was sluggish and unwilling to move, although able to do so when pushed. This torpor gradually increased, the skin became insensitive, the eyes remained half closed, and the limbs appeared feeble, especially the hind legs. When roughly shaken, the torpor passed off for a time, and the rabbit even ate a small quantity of lettuce. In a few minutes, however, the animal again sought the corner, and relapsed anew into the state of stupor above described. If carefully handled, it was then possible to place the animal on her side, or even to suspend her head downwards, without the least show of resistance or discomfort. During the continuance of these symptoms, the heart beat feebly and the respiration was labored, and sometimes jerking in character. Eighteen hours after receiving the sassy, the rabbit was more active, but not free from a marked langnor or difficulty, which appeared in all of her motions. Twenty-five hours after the poisoning, the stupor seemed to have deepened again, and was so profound that the eyes remained nearly closed, and the head, resting on the fore paws, rolled to one side or the other. The rectal temperature was now 102⅘° F., or about one to two degrees below the normal standard. So insensible was the rabbit at this time, that she did not appear to feel the passage of the thermometer bulb through the sphincter, although the operation is usually resisted by all animals with great energy. Within ten minutes she slept again, notwithstanding that the thermometer was still in the bowels. Fifty hours from the date of the first dose, the animal was again reviving. At this time she received 1g of the tincture in the stomach, and 1g in the rectum, where it was confined by suitable means. In twenty minutes chewing motions of the jaws were observed, the head fell and was caught up again, and at last reposed on the fore paws, the pupils contracted, the heart became slow and irregular, the respiration quick and labored, and at length, in one hour from the last dose, death occurred with general convulsions and sudden dilatation of the pupils. Upon examination, post mortem, the membranes of the brain were found to be highly congested, but no other appearance of specific value presented itself.

Experiment. A small cat received internally five grains of dried extract of sassy. At the close of two hours she was sluggish, and, half an hour later, vomited with great violence. The matters rejected had none of the color of the extract. Another dose of four grains was vomited up within an hour, and apparently caused great discomfort, due perhaps to the nausea caused by the drug rather than to pain. The disposition towards stupor, which was seen after the first dose, appeared to be relieved by the emesis. The cat survived, and next day was none the worse for the ordeal.

Experiment. A large pigeon received, under the skin of the belly, eighty gtt. of the partially evaporated tincture of sassy. At the same time twenty drops of the tincture were given internally. Within half an hour the pigeon sought a corner, and assumed the usual sleeping posture, the eyes closing and the respiration being rather uneasy and laborious. Now and then it awoke and staggered about, only to sleep again in a few minutes. When thoroughly aroused

by rough shaking, it exhibited more activity. Fifty-five minutes after receiving the sassy, the pigeon vomited very freely. Occasionally, the sleep, into which it always relapsed, became so profound that it staggered and fell down. At the end of two and a half hours the sleep had become comatose, and no agency had power to break it. Meanwhile the sensibility of the surface was impaired, the respiration suffered, the temperature fell to 97½° F. in the cloaca, and death took place, without convulsions, three hours and a half from the time the first dose was given. A second pigeon, similarly treated, except that the doses were smaller, survived twenty-four hours and exhibited no symptoms of importance which have not already been noted, except that at the time of death very slight convulsive movements were seen.

It was apparently plain, from the above detailed observations, that the sassy bark contained a narcotic, or at least a stupefying principle, and it was also probable that it possessed emetic activity. This, however, could scarcely be inferred from the effect upon the cat or the pigeons, because these animals vomit upon very slight provocation. The experiments upon animals had, however, convinced us that we were dealing with an agent that could be safely used in large doses, and which was certainly not a potent poison. Moreover, it was possible that the emetic effect, observed during its liberal use in half-pint doses for ordeal purposes, might be due to the bulk of the infusion, which the person suspected was forced to take. Should this have proved correct, and its emetic powders be really feeble when taken in moderation, we should possess a drug in which co-existed narcotic and astringent activity. Such a remedy would have had a certain value, and, considering the poverty of our pharmacopœia in good narcotics, could not have been overlooked. We were also aware that Dr. Thomas Savage, formerly a practising physician on the coast of Africa, had made use of sassy bark in dysentery, but with what effect we were then unacquainted.

With these considerations in view, we resolved to test still further the properties of sassy bark, by experimenting upon ourselves. Accordingly one of us took, fasting, three and a half grains of dried extract of sassy. Four hours later he took forty-five drops of the tincture. No effect was perceived, and fourteen hours later he took, fasting, one hundred and twenty drops of the tincture. These repeated doses had no effect, except to interrupt the regular daily action of the bowels. Again, in five hours, another dose of one hundred and twenty drops was taken. Up to this time no symptoms were developed which could be referred with confidence to the effect of the sassy. On a second occasion the same individual took, at one dose, one tablespoonful and a half of the tincture of sassy bark. This large dose was taken two hours after a light meal, at about 9 p. m. Half an hour afterwards, while engaged in writing, he experienced some little giddiness and slight frontal pain, with a sensation of fulness, chiefly at the front of the head. None of these symptoms were of marked intensity. About ten o'clock the tendency to sleep became so apparent that he ceased writing, in which occupation he had been previously engaged, and left the house in the hope that a brisk walk would lessen the effect of the dose. This proved to be the case, but as the narcotic influence faded, a rapidly increasing nausea took its place, and resulted in violent emesis at one a. m., five hours after the tincture was employed. In both instances the pulse fell about fifteen beats below the normal standard.

The effects of the sassy upon another of the authors of this paper is recorded in the following statement:

"At 11 a. m. he took four drachms of the saturated tincture of sassy. At the time his pulse was ninety-one per minute. He experienced no unusual sensations till about 13 m., when slight dizziness ensued. At this time his pulse was eighty-three. The narcotic influence was not increased, and at 1 p. m. the pulse beat ninety-three. At this hour he took four additional drachms. At 2 p. m. his pulse had fallen to eighty, and the sedative effect was very sensibly

experienced. Repeated the dose. The pulse continued at from eighty to eighty-four till 5 p. m., when it began to rise. At 7 it was ninety-three. After the third dose the narcotic effect was well marked, but was not greater than would have been produced by a grain of opium. The principal feeling was a pleasant lassitude, a desire for quiet, and an indisposition for either mental or physical exertion.

When the first dose was taken his bowels were slightly loose, and there was some little griping. Both, however, were relieved, and the following morning the bowels were somewhat constipated.

Two days after the foregoing experiments he took, at 10 a. m., one ounce of the tincture. Its effect, marked by a decline in the rapidity and force of the pulse, and the feeling of lassitude above mentioned, was experienced in half an hour. The narcotic was well marked, and was accompanied with headache and slight nausea. The pleasant feelings, experienced with the smaller doses, did not accompany the action of the larger quantity. The pulse remained at from eighty to eighty-five per minute, till about 4 p. m., when the effects began to wear off, although the face was unusually flushed as late as 7 o'clock the same night.

Upon careful consideration of the foregoing experiments, we are disposed to conclude:

1. That sassy bark is a feeble narcotic.
2. That it is nauseant and emetic.
3. That it has a marked astringent effect, and that we have seen nothing justifying the belief in the purgative powers ascribed to it by some writers.

II. Pathology.

Dr. Mitchell related some curious observations made by him, in the course of experiment, as to *the effect of sugar in rendering the eyes of frogs cataractous.*

When a solution of sugar is injected into the stomach of a frog, or thrown into the subcuticular cellular tissue of the animal, it becomes torpid and dies. In these cases the eye was observed by Dr. M. to present a cataractous appearance. On extracting the lens, the white appearance was found extending into it more or less deeply, as the death had been more or less slow. When the eye was allowed to macerate in water, the appearance of the lens changed and the opacity disappeared.

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*September.**

I.—Anatomy.

Dr. Schmidt read a communication containing an abstract of the most important points of his researches on the minute anatomy of the human liver. He said:

During the last 18 months, the greater part of my time has been devoted to the investigation of the microscopic anatomy of the liver. The results of that portion of these investigations which had reference to the *minute anatomy of the hepatic lobule*, I published in the last *January* number of the *Amer. Journal of Med. Sciences.* Continuing my researches, I directed them especially to the *general* construction of the *human liver.* Besides having found further evidences of the correctness of my observations in reference to the commencement of the *hepatic ducts*, I have discovered *other* interesting facts relating to the liver. These facts, although complicating our idea of the construction of the liver, nevertheless will explain certain phenomena which have been noticed long ago by various observers.

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* No meetings were held during the months of July and August.

As some time will yet elapse before the completion and publication of my next essay on this subject, I wish to give to-night an abstract of the most important points of my researches. It is as follows:

The *parenchyma* of the *human liver* consists of *two distinct networks* of capillaries, with hepatic cells, free nuclei, and granules. These networks of capillaries are not divided by partitions of fibrous tissue into lobules, but are continuous throughout the whole organ. The meshes which they form are occupied by the cells, nuclei, and granules. One of the networks is formed by the ramuscules of the *portal vein* and *hepatic artery*, and joins the smallest branches of the *hepatic veins*. The other commences independently near the smallest branches of the *hepatic veins*, and is continuous with the finest ramuscules of the *hepatic duct*, and *most probably* also with those of the *lymphatic vessels* of the organ; so that an injection thrown into the *hepatic duct* will return by the latter set of vessels. The capillary vessels forming the last-mentioned network I have described in my former paper on the liver, and called "*biliary tubules*," to distinguish them from the capillaries that carry the blood.

The whole organ is closely surrounded by a capsule of areolar tissue; from this, processes are given off which enclose the vessels, ducts, lymphatics and nerves, and thus become their proper sheaths.

The *portal veins*, *hepatic artery*, and *hepatic duct*, accompanied by *lymphatics* and *nerves*, enter the organ in close proximity at its inferior surface; their larger branches spread out laterally, in a radiating manner, like a fan; some of the vessels, forming the lateral margins of which, run forward, and some backward. The *hepatic veins*, proceeding from the ascending *vena cava*, enter the organ posteriorly, and their larger branches run in a postero-anterior direction; but their secondary branches also radiate, and then run almost parallel with those of the *portal vein* and *hepatic duct*.

The sheath which surrounds the *portal vein*, *hepatic artery*, &c., has usually been known under the name of the "*capsule of Glisson*;" but as the capsule of the *hepatic veins* is strictly analogous to it, I shall, for the sake of simplicity, in referring to it, designate it the "*capsule of the portal vessels*," or "that of the *hepatic veins*."

Besides the vessels, ducts, lymphatics, and nerves already enumerated, there are in the liver very extensive plexuses, formed by the *ducts of racemose glands*, which I regard as a *special system*. This system of glands has been noticed and described to a certain extent by several observers, yet their relationship to the hepatic ducts and lymphatics has to my knowledge never been thoroughly investigated. They are found on the lower surface of the liver, establishing an extensive communication between the larger ducts. They are very abundant on the capsule of the portal vessels, as far as the point where the true interlobular ducts commence, and also exist in the walls of the gall-bladder. The details of this system of glands I shall give in my next essay. For the present, may it suffice to say that their *ducts*, the diameter of which ranges from 1-700th to 1-4000th of an inch, anastomose freely with each other and form with branches of the *hepatic artery* and *portal vein* (given off within the capsule) a very intricate plexus. From the smallest branches of the latter vessels a capillary *rete* results, which surrounds the lobules of the glands. Judging from the size of the blood-vessels forming the plexus, the supply of blood to these organs must be very abundant.

Another *set of vessels*, or *ducts*, of a diameter from 1-500th to 1-2500th of an inch, with single follicular appendages, proceeds from the *plexus of racemose glands* to communicate freely with the plexus of microscopic *lymphatics*. These vessels I have also found in the *capsule* of the *hepatic veins*. The lobules and larger ducts of the racemose glands are lined by an epithelium of flat hexagonal cells, with large, distinct nuclei, resembling in form and appearance those of the epidermis of the frog.

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The *interlobular* and *lobular hepatic ducts* do *not* arise from the glandular plexus, but they can always be traced back to larger ducts.

In front of the *vena cava*, where it passes the substance of the liver, I have found a very dense plexus of the peculiar vessels with follicular appendages already described, and of others without them. A portion of it, about one inch long and half an inch wide, consisted of several layers of these vessels, distinctly enclosed between two layers of the capsule. A network of arteries, similar to that found in other parts of the capsule, was seen in the layers of the latter. The plexus itself I observed both in the injected and fresh specimen, communicating or arising from large vessels, which, by a close examination, proved to be the *lymphatics* of that region, by the *valves* they possessed. Almost around the whole *vena cava* at this place, anastomoses of the above described vessels can be seen.

The description of the microscopic lymphatics of the liver I shall give in my next essay on this subject.

The *interlobular* branches of the *portal vein* and *hepatic artery* are derived from a plexus which is formed by some of their branches in their *capsule*.

Some of the branches of the *hepatic artery* penetrate to the surface of the liver; they are tolerably large and anastomose freely with each other in the *capsule*. From the *anastomoses* thus formed, *smaller branches* proceed, which again in their turn give origin to still *smaller ones*. The latter vessels, when viewed under a low magnifying power, have the appearance of a broken network of large capillaries with large meshes, and as such they have been regarded and described by other anatomists. However, if examined more closely in well injected specimens, we find that they form *no* network of their own, but terminate in the *capillaries of the lobule*.

The *portal vein* also sends small branches to the surface, which, however, do not anastomose with each other. They accompany the larger branches of the *hepatic artery*, (mostly the second set in size, above mentioned,) to terminate likewise in the *capillary network of the lobule*. Thus, there exists *no other communication* between the branches of the *hepatic artery* and those of the *portal vein* on the surface of the liver, except through the *medium of the capillaries of the lobule;* and the blood of the artery, instead of returning to the portal vein, as has been asserted, is with that of the latter discharged into the *capillaries of the lobule*, by which route it arrives directly in the branches of the *hepatic veins*.

The analogy of the blood vessel on the surface of the liver to those in the interior of the organ I shall prove in my next essay.

II.—Therapeutics.

Dr. Leidy read a paper, entitled "*On the seat of the vesicating principle of the Lytta vittata.*"*

From the experiments detailed in this paper, it appears that the vesicating principle of the Lytta vittata belong to the blood, the peculiar fatty substance of certain accessory glands of the generative apparatus, and to the eggs.

III.—Toxicology.

Dr. Morris related several cases of poisoning from the sting of the common bee. In one case, a man died in a very short period of time after the injury was received. In this instance the sting was received in the cervical region. In a second case, an adult was seized with convulsions, which lasted for a considerable time. There was during these convulsions complete opisthotonos. He stated that some thirty or more cases, similar to these, have been reported

* See the American Journal of the Medical Sciences, for January, 1860.

October.

I.—ANATOMY.

Dr. Schmidt, with reference to a communication made by him at a meeting held in September, exhibited two livers of sheep, in order to show the method pursued by him, in making his injections. It is as follows:

The liver is placed in a basin from which the air is exhausted. The apparatus is so arranged, that, when desired, a communication can be established with the blood vessels. In making an injection, the pressure is exerted chiefly by the weight of the fluid, which is in a column about six inches in height. So soon as the injection is made in this way into the hepatic duct, the fluid used issues from the lymphatics. The injections are also made in a second manner, the organ not being kept in a vacuum. In this, the lymphatics and their glands are also injected, though the pressure of the air prevents the liquid from flowing from the opened mouths of the lymphatic vessels, as it does when this pressure is removed.

In both the preparations exhibited by Dr. Schmidt, one having been injected in a vacuum, the other not, in the way just described, the lymphatic vessels, and also their glands, were seen injected.

II.—PHYSIOLOGY.

Dr. Morris read the following paper:

Remarks on the Digestive Principle. By J. CHESTON MORRIS, M. D.

In the course of some observations offered to the Department at the session of June 7th, 1858, on the subject of endosmose, I suggested the hypothesis that during digestion a watery fluid was secreted from the gastric mucous membrane, containing a principle which was capable of splitting, or undergoing a fermentative change, so as to produce lactic acid and so-called pepsin. I now have the pleasure of laying before the Department the facts necessary to substantiate that hypothesis.

When a very dilute solution of ov-albumen is exposed to the air at a moderate temperature for several days, it becomes cloudy and has a slightly acid reaction. This change is hastened if air is forced through the solution from time to time. If a small portion of this be added to fresh milk it will cause coagulation of the latter in a short time; boiling the solution previously, diminishes this property. When a thin portion of coagulated albumen is placed in the solution at a warm temperature, it is dissolved in the course of a few hours; if the solution be previously boiled, no such change occurs. When the solution is distilled, the distillate yields a white curdy precipitate with nitrate of silver, soluble in an excess of ammonia.

The above facts correspond so closely, as far as they go, with the properties of the gastric juice that I have no hesitation in stating my belief that they afford the explanation of the mode of formation of the latter. We have, in effect, an albuminous fluid in the stomach, placed under appropriate circumstances as regards oxygen and temperature for the occurrence of fermentative changes; and if by imitating these conditions out of the body we produce analogous results, we have the strongest reasons for believing that the causes and mode of operation are the same in the living body.

The foregoing experiment offers also a satisfactory solution of the apparently discrepant views held by different investigators as to the digestion of azotised food. It becomes no longer difficult to comprehend that the gastric juice, the pancreatic fluid, and the intestinal secretion, as well as decomposing albuminoid matters, may all possess the power of causing a solution of coagulated albumen, &c.; inasmuch as a splitting of an element common to them all, viz. albumen, gives rise to an acid, (probably lactic,) and a digestive principle. I regret that I have not been able to make an ultimate analysis of the substance obtained by evaporating the solution above mentioned to dryness at a low temperature.

These experiments also set at rest the mooted question of the free acid of the

gastric juice; proving that the lactic acid developed during the fermentation of albumen is capable of decomposing during distillation the alkaline chlorides found in the white of the egg.

I should state, however, that I do not regard the above facts as finally conclusive on the subject. More experiments are required to demonstrate the identity of the principle obtained with pepsin.

Dr. Woodward objected to considering the ferment thus produced identical or even closely similar to that of the gastric juice. The gastric juice which this fluid was supposed to resemble did not putrify if kept even for months, whereas the solution produced from albumen, as was stated by Dr. Morris, rapidly putrified. So also the peptones did not undergo putrefaction even in a considerable period of time; the gastric juice acting as an antiseptic, which it appeared from Dr. Morris' statement was not the case with the solution of albumen formed by the new ferment. He suggested the following points for investigation before the similitude should be hastily determined upon.

1. Is the solution of albumen in the new ferment albuminose, and has it its peculiar reactions?
2. Will flesh and similar nitrogenous compounds be dissolved?
3. Will the new ferment interfere with the transformation of starch into grape sugar, as does the gastric juice?

And, lastly. Is the peculiar fungus of the gastric juice developed in it when kept?

II.—PATHOLOGY.

Dr. Mitchell read a paper, entitled "*On the Production of Cataract in Frogs by the injection of large doses of sugar.*"*

November.

I.—PATHOLOGY.

Dr. Woodward exhibited a specimen of foliaceous crystals of the Phosphates formed during the slow alkaline fermentation of urine in a close stoppered phial. These crystals were remarkable for their huge size, some of them being $\frac{1}{8}$ of an inch in length. In chemical behaviour they exactly resembled the smaller sized stellar and foliaceous crystals common to alkaline urine.

Dr. Woodward also exhibited a specimen of highly *acid urine*, in which the acid fermentation had been progressing several days, accompanied by a sediment of uric acid. On the surface was a scum of Penicilium glaucum, which entangled in its meshes numerous crystals of the ammoniaco-magnesian phosphates in fine prisms. This observation, which was the first of the kind he had made, contradicted the general statement made by some, that phosphatic crystals only fall in alkaline urine.

December.

I.—PATHOLOGY.

Dr. Woodward read a paper entitled "*Remarks on errors in the anatomical diagnosis of Cancer.*'†

In accordance with the By-Law of the Department to that effect, the officers of the Department for the ensuing year were elected at the first meeting of the month. They are as follows:

Director—Dr. Leidy.
Vice-Director—Dr. S. W. Mitchell.
Recorder—Dr. Walter F. Atlee.
Treasurer—Mr. Queen.
Conservator—Dr. J. Cheston Morris.
Auditors—Messrs. Slack, Sergeant and Dr. Wurts.

* See American Journal of the Medical Sciences, for January, 1860.
† See American Journal of the Medical Sciences, for April, 1860.

DONATIONS TO MUSEUM.—1859.

Jan. 4th. Horns of the Rocky Mountain Sheep. Presented by Dr. T. G. Richardson.

A collection of Lizards and Serpents from Honduras. Presented by J. S. Hawkins and J. L. LeConte, M. D.

A collection of Reptiles from the Isthmus of Panama. Presented by Dr. John Gallaer.

Cones of Pinus pungens. From the Alleghany Mountains. Presented by W. Parker Foulke.

Jan. 11th. Canis occidentalis, Meles labradorica; 30 skins, 25 species, Birds. New Mexico. Presented by T. Charlton Henry, M. D., U. S. A.

Nyctea nivea. Berks county. Presented by Dr. Bertholet.

Two Numulites. Gizeh, Egypt. Presented by J. A. Slack.

Three Palæotrochus, Emmons. Montgomery county, N. C. Three specimens of Pyrophylite. Orange county, N. C. Presented by S. B. Buckley.

Feb. 1st. Fine mounted specimen; the famous trotting Horse "Edwin Forrest." Presented by James Hammill.

An Emys, from Honduras. Presented by J. S. Hawkins and Dr. J. L. Le Conte.

Feb. 8th. Nearly entire lower jaw, fragment of the cranium, atlas, axis, astragalus, and head of os femoris, of the extinct Hippopotamus of Europe; five bones of the extinct Horse, and one bone of the extinct Ox. Presented by Isaac Lea.

A collection of fossils from the permian and carboniferous rocks of Kansas, described in the recent papers of Messrs. Meek and Hayden. Obtained by purchase with part of the subscription fund of Messrs. T. B. Wilson, Joseph Leidy, Joseph Jeanes, Thomas Harris, Isaac Lea, and Joseph Harrison.

Specimen of elastic Marble. Pittsfield, Mass. Presented by T. B. Wilson.

Two specimens Cursorius isabellenis. Africa. Presented by W. S. Vaux.

Sternum and trachea of Grus americana. St. Simon's Island, Ga. Presented by P. B. Wilson.

Specimens of Bursatella and larvæ of a Myrmeleon. From the coast of Florida. Presented by P. B. Wilson.

Three Cymothoa. Gulf of Spezzia. Lieut. Geo. H. Hare.

Two vertebræ of Priscodelphinus. Miocene, New Jersey. Vertebra of Carcharodon. Green Sand, New Jersey. Presented by Mr. W. M. Gabb.

Skull of an Apache child; do. of an Utah Indian girl; 2 do. of Moqui Indians. Presented by Dr. J. Letterman, U. S. A.

Sixty species of plants collected in Wisconsin. Presented by T. A. Lapham through Mr. Durand.

March 1st. Tooth of Lamna, and a fossil shell. Piece of brown Coal. From Switzerland. Presented by Mr. F. Dimpfels.

Fragments of Sandstone, from Connecticut, with obscure vegetable remains. Presented by Miss Mary Powel.

Two specimens of native Copper. Portage Lake, Lake Superior. Two specimens of Mice. Lake Superior. From B. A. Hoopes.

March 8th. Two Lesbia Gouldii. New Granada. Presented by J. C. Trautwaine.

Kinosternum Henrici, Le Conte. Gila river, New Mexico. Presented by T. C. Henry, U. S. A.

Gar Fish, *Lepidosteus bison?* Caught in the Delaware river at Bombay Hook. Presented by Mr. Andrew Vanderslice.

Obsidian. Ascension Island, South Atlantic. Presented by J. M. Semple, M. D., U. S. N., through Dr. Ziegler.

Seven perfect teeth and fragments of others, with portions of jaws, ribs, &c., of Mosasaurus. Tooth of Otodus obliquus, and vertebræ of do. Monmouth Co., N. J. Presented by T. M. Perrine.

A tooth of Mosasaurus. Monmouth Co., N. J. Presented by D. Baird.

Humerus of Mosasaurus, and fragments of a fish jaw. Presented by Mr. M. P. Rue.

Several fossil shells. Presented by Mr. Forman.

Specimen of Egyptian wheat, and seven Egyptian figures of Osiris. Deposited by Mr. Slack.

Acorns of Quercus rubra. Wissahicon. Presented by Mr. J. Goucher.

Twelve specimens of insects from China and Japan. Presented by Dr. Henderson, U. S. N.

Thirty-eight specimens 25 species birds, from New Mexico. Presented by Dr. T. C. Henry, U. S. A.

Zeolite. Manayunk Tunnel, Montgomery Co., Pa. Presented by W. G. E. Agnew.

Chabazite and Stilbite, from the same locality. Presented by Theo. D. Rand.

A fine Stereoscope. Presented by J. W. Queen.

April 5th. Vertebra, humerus, and four teeth of a Spermaceti Whale. Large metatarsal bone. Tooth of Carcharodon megalodon. A collection of shells. From the Miocene marls of Virginia. Presented by Dr. Alexander Bryant.

Pumice stone. From Syria. Presented by H. S. Osborn.

Shark teeth, fragments of Turtle bones, shells, and corals, from the Green Sand of New Jersey. Presented by Wm. M. Gabb.

A collection of muds and lignites, from Washington Territory. Presented by Geo. Davidson, Esq.

Calamite. Pictou, Nova Scotia. Mr. Struthers.

Teeth of three genera of reptiles, scales, and bones of ganoid fishes, coprolites, and vegetable remains. From the slate rocks of Phœnixville Tunnel, Chester Co., Pa. Presented by Messrs. Vaux, Sergeant, Powel, Tilghman, and Leidy.

Specimens of Alosa manhaden, with a parasitic crustacean adhering to the roof of the mouth. From the coast of North Carolina. Presented by Dr. Norcom of Edenton, N. C.

April 12th. Fragments of jaws and teeth of Mosasaurus. A collection of bones of an unknown Saurian. Teeth of three species Sharks, palate of Pycnodus, and jaw of Enchodus. Several fossil shells. Green Sand, Monmouth Co., N. J. Presented by J. A. Slack.

Three Unio Shepardianus, Lea. Georgia. 1 U. capax, Green. Mississippi. 2 U. Boykinianus, Lea. Georgia. 2 U. patulus, Lea. U. clavus, Lam. Ohio. Presented by I. Lea.

Three specimens of opalized wood. Little Colorado, New Mexico. Presented by Dr. Woodhouse.

Numerous fragments of a ferruginous rock containing remains of ganoid fishes. From Bethany, Va. Presented by P. W. Mosbleeh.

A small collection of shells. Juan Fernandez. Presented by Ed. S. Whelan.

Skins of Lupus occidentalis, Platte river; Erethizon spixanthus, Fort Defiance; Mustela pennantii, Fort Umqua; Procyon hernandezii, California; Putorius vison, Astoria; Lynx fasciatus, New California; Ovis montana, Cervus macrotis ♀ ♂ Vulpes virginianus, Taxidea americana, Lynx rufus, var., Lepus californicus, L. trowbridgii, 3 Spermophilus beecheyi, Sciurus fossor, Neotoma mexicana. Fort Tejon. Skulls of Lynx rufus, and Cervus macrotis. Presented by the Smithsonian Institution.

Skull of a Bear (Ursus americanus?) and a fragment of a mastodon bone, found in the drift of the Mississippi. An Albino mole, Scalops. Presented by W. D. Moore of Oxford, Mississippi.

Two large masses of phosphatic rock with imbedded turtle bones. From Sombrero, West Indies. Presented by Joseph B. Hanson, Esq.

One Partula and two Achitinella. Sandwich Islands. Presented by Dr. Thos. J. Turner, U. S. N.

Fine specimen of a male Bengal Tiger. Presented by J. W. Gregory, Esq.

May 3d. One Serpent. Mrs. Bussier. One Serpent and one Frog. Mr. Slack. Jaw of Centrophorus. Presented by Dr. I. I. Hayes.

A collection of Hymenoptera, Hemiptera, and Lepidoptera. From Fort Tejon, California. Presented by John Xantus.

Fragment of jaw of Mosasaurus with the teeth. Phosphate of Iron. Freehold, N. J. Presented by O. R. Willis.

Meerschaum. Presented by Dr. Rand.

Large slab of Coal shale with ferns. From Schuylkill Co., Pa. Presented by Messrs. Haas and Brenizer.

Dynastes hercules. San Juan, Del Norte. Presented by Henry Etting, U. S. N.

Two Hanging Birds' nests. Island of Penang, Straits of Malacca. Presented by J. E. Semple, M. D., U. S. N.

Fine specimens of infusorial earth, from Richmond and Rappahannock river, Va. Presented by Prof. R. E. Rogers.

Two eggs of a Tern. Island of Ascension. Three Grasshoppers, two Mole-crickets, one Beetle. China. Three young Turtles and a Crab. Island of Ascension. Fruit of Dimocarpus Litchi. Reunited fractured thigh bone of a bird. Presented by J. E. Semple, M. D., U. S. N.

Lumpus anglorum. New Jersey. Presented by

Lepidodendron in shale. Horton, Nova Scotia. Presented by J. C. Trautwine.

Cocoons of the Emperor Moth, filled with those of an Ichneumon. Presented by J. R. Remont.

May 17th. Cast of a Chinese skull, cast of an Icelander's skull, and two Swedish crania. Deposited by Drs. T. J. Turner and J. A. Meigs.

One Water Snake. Gulf of Siam. One Snake. Siam. An Opium pipe. Presented by J. E. Semple, M. D., U. S. N.

Nine Specimens, two species Palæotrochus. North Carolina. Reptilian tooth and scales of fish. Coal of Chatham Co., N. C. Two teeth of a fish. North Carolina. Presented by Prof. E. Emmons.

Specimen of the preserved vegetable food which was prepared for the Crimean army. Presented by Mr. Tilghman.

Lignite coal with amber, from Puget's Sound. Presented by Dr. T. J. Turner, U. S. N.

Large skeleton of the Frog. Presented by Dr. Leidy.

Specimen of crystallized lead. Presented by Charles Lennig.

May 24th. Four vertebræ of an extinct Delphinus. From Gloucester Co., New Jersey. Large specimen of Madrepora securis. Tortugas. Deposited by J. H. Slack.

Cervus cornix. Upper Egypt. Presented by J. H. Slack

June 7th. Two specimens, male and female, Chatoëssus, n. s. Sturgeon Pond, two miles below Trenton, N. J. Presented by Charles C. Abbott.

Five fossils. Green Sand of New Jersey. Skeletons of the Cat, Musk-rat, Mole, and Mouse. Deposited by J. H. Slack.

Fossil Spatangus. Eocene of North Carolina. Specimen of a lower jaw of Dromatherium sylvestre. Coal of Chatham Co., N. C. Presented by Prof. E. Emmons.

Ten specimens, 4 species small fishes, from near Trenton, N. J. Presented by Charles C. Abbott.

A three-toed Sloth. Presented by Dr. S. P. Brown.

Small collection of fossil bones, Mastodon, Deer, and Bear. From near Pemberton, N. J. Presented by Joshua Hoopes.

Three hundred and twenty-five specimens of Arachnidæ. From the country between the Mississippi river and the Rocky Mountains. Presented by Dr. Wm. A. Hammond.

A fossil Crab, Lupa ——— ? from the tertiary of Maryland. Presented by W. C. Taylor.

Tooth of Holcodus acutidens. Green Sand of Mullica Hill, N. J. Presented by Dr. Hartman.

Teeth, vertebræ, and fragments of other bones of Holcodus acutidens. Green Sand of New Jersey. Presented by W. Parker Foulke.

Specimen of Neviusia Alabamensis, a new genus of Rosaceæ. From Alabama. Presented by Prof. Asa Gray.

Specimens of Pyrophylite. Montgomery Co., N. C. Presented by Prof. E, Emmons.

Lignite. Marl of New Jersey. Presented by Wm. M. Gabb.

A dissecting microscope, of Powel and Leland, and a fine Camera lucida. Presented by the Executors of Dr. C. F. Beck.

June 14*th*. Collection of Volcanic minerals. Mount Vesuvius. Presen'ed by J. Hinckley Clark.

Large Balani. Panama. Presented by H. C. Hanson.

Two casts of skull of Rutiodon, one cast of tooth of Ontocetus. Presented by Prof. E. Emmons.

Two fossil Corals. Seneca Co., Ohio. Presented by Dr. Noah Kollar.

Arragonite. From the Himalayas. Presented by Dr. J. Thomas.

Hesperomys. Cape May Co., N. J. Presented by Mr. Krider.

Frog, from Falls of Niagara, and Lizard, from Delaware Water Gap. Presented by Mr. Krider.

July 5th. A Chinese, Hindu and N. American Indian skull. Presented by Dr. J. Dickson Bruns, of Charleston, S. C.

Fragment of Anthracite, with peculiar bird-eye fractures. Presented by W. P. Foulke.

Two fossil shells, head of a femur of a fossil Turtle, jaws of Scarus, several fragments of rocks, a Scolopendra, and a collection of Lizards. Sombrero, W. I. Presented by Joseph Hanson, Esq.

Tringa himantopus, and hybrid of Tetrao cupido and T. phasianellus. New York. Mr. J. G. Bell.

A collection of post-pliocene land shells. Washington Co., Texas. Presented by F. Moore.

Plagiostoma, n. s. Cretaceous, Tennessee. Presented by Mr. Safford.

Slag, from a Copper-ore furnace—Chile. Presented by Dr. Ruschenberger.

Deformed Rat. Presented by Cornelius Moore.

Papyrus, from Syracuse, Sicily. Ostrich eggs. Africa. Tusks of Boar. Tunis, Africa. Seed vessel, Africa. Presented by Lieut. Thos. Y. Field, U. S. N.

July 19th. Collection of vertebrate remains from the post-pliocene formation of South Carolina, consisting of teeth of Bos taurus, teeth of Hog, teeth of Sheep, teeth of Equus fraternus, of deer, of Fiber zabethicus, of Castor Canadensis, of Megatherium, of Cervus Canadensis, of Elephas Americanus, of Alligator Mississippiensis, of Tapir Americanus, and some fragments of Bird bones. All from Ashley river. And teeth of Horse from Cooper river. Also bone of Turtle from same, and teeth of Mastodon from Christ Church Parish and from Cooper river, and Vertebra of Mastodon from same. Presented by Prof. Holmes, of Charleston, S. C.

Aug. 3d. Peltocephalus. Skull of ——— ? Skin of small Lizard. Amazon. Presented by John Krider.

Specimen of Peat coal. Bahia, Brazil. Bulimus ovatus. Brazil. Presented by G. W. Farquhar.

Three specimens of Ictinea Mississippiensis, male, female and young. Red Fork, Arkansas. Presented by S. W. Woodhouse.

Vireo flavifrons. Grand Rapids, Michigan. Presented by Wm. H. DeCamp, M. D.

Upper jaw of Crocodile. Skull of Dicotyles, of Tapirus americanus, of Procyon cancivorus. Specimen of Gutta surinamensis, made from juice of Bally tree, (Lucuma mammosa.) Hides of Myrmecophaga jubata and of Procyon cancrivorus, Testudo, Peltocephalus, Kinosternum. Surinam. Presented by C. J. Hering.

Collection of fossil shells and deer's horn, from the marl of New Jersey. Presented by Mr. Slack.

Aug. 9th. Molar of Elephant, from the tertiary deposit of Williamette Valley, Oregon. Presented by Dr. John Evans.

Aug. 22d. Three Salamanders. Little Rock, Arkansas. Presented by Francis Richards.

Several Beetles, from New Jersey. Presented by W. G. E. Agnew.

A water Beetle, New Jersey. Presented by G. W. Fahnestock.

1 Lepus, 1 Felis, 2 Sciurus, 1 Scalops, 1 Vespertilio. Presented by George Davidson.

Fragments of a fossil Turtle. Mullica Hill, N. J. Several Shark teeth. Presented by Mr. Gabb.

A large Diodon. St. Domingo. Presented by Edward L. Clark.

Seven Spiza ciris. St. Simons, Georgia. Presented by S. W. Wilson, M. D.

One Rana Catesbyi. Georgia. Presented by Major Le Conte.

Sept. 6th. Two fossil antlers of the existing Elk, from the loam above the

...ssil shells. Presented by

...ented by Franklin Peale.
... St. Thomas, W. I
...e Davidson.
...iron. From Venezuela. Pre

... A Pomoxis and Platirostra

Presented by Dr. Dunn, of New

...us obliquus, Seriola chloris, Homo-
...noxis hexacanthus, Bothrolæmus
...alvomaculata, Elapsaurus. South

...us, Temnodon, Bothrolæmus, Pristo
...y Dr. J. M. Corse.

... and fishes, 23 shells, 30 teeth of sharks.
... lignite and suite of clays. From

...us euryceros and do. of Bos primigenius.
...Slack.
...sited by the same.
... Manchester, Moss.

... cretaceous and carboniferous fossils from

... sport, Me. Presented by J. G. Cooper, of

...tz, from the Kansas gold mines, (Pike's Peak,

...a, from Chester Co. Presented by W. Parker

...ion, with a nucleus of metallic iron. Narragansett
...Dr. Boker.
...lamus of Darien. Presented by Lieut. Thos. Y

...n Gayhead. Presented by Mr. Stimpson.
... Deposited by Mr. J. H. Slack.
...stomoid fish. N. Jersey. Collection of fragments
... Collection of fossil shells. Crosswicks, New Jersey.
... Slack.
... Viklava. In exchange.
... Lake George. Presented by R. W. Davids.
...ion and Lamna. Monmouth Co., N. J. Presented by

... Septaria. From Wm. Worrell.
... Crustacea, 3 radiata, 5 mollusca. From Boston, Martha's
... Fossil. Presented by J. H. Slack.

... ...ens, 6 species fishes; 6 jars, 6 species mollusca; 6 ...
... ... I., 2 jars marine annelides. Coast of Massachusetts.
... Slack.
... ...ens from the Andes, consisting of 43 species. Presented
... S. Buckalew, U. S. Minister to Ecuador.

... large living specimens of Pityophis Sayi, from Rock Island
... Presented by J. D. Sergeant.
Schuylkill Co., Pa. Presented by Robt. Pearsall.

Skull of Equus asinus and skeleton of Arctomys monax. Deposited by J. H. Slack.

Nov. 9*th.* Mounted specimens of Antelocapra americana, m. and f. From the Yellowstone river.

Cervus macrotis. Obtained by Dr. Hayden during Lieut. Warren's Expedition. Arctomys pruinosus. Puget's Sound. Obtained by Dr. Kennerly. Vulpes virginianus. From the Smithsonian Institution.

Large specimen Cyanosite, (Sulph. Copper.) From Eureka Mine, Polk Co., Tennessee. Prom Prof. W. J. Taylor.

Several carboniferous fossils. Fort Belknap, Texas. Presented by Dr. Moore.

Monstrous human finger nail, (8 in. in length,) from a negro of Georgia. A double catfish, from the coast of Georgia. Presented by James Postell.

Large Hornet nest. From Bucks Co., Pa. Presented by E. S. Whelen.

Nov. 22*d.* Two very large and very fine specimens of Lepidodendra. From Mine Hill, Schuylkill Co., Pa. Presented by Eugene Borda.

A collection of minerals and mineral waters, from the Geysers, about 72 m. N. N. W. of San Francisco, California. A large Acanthopterygian fish, 7 feet in length. From the Bay of San Francisco, California. Presented by George Davidson.

A large collection of polished tablets of minerals. From Edward J. Willcox.

An Indian skull and stone adze. From the neighborhood of Trenton, N. J. Presented by Charles C. Abbott.

A small collection of miocene fossils from Virginia, and cretaceous fossils from New Jersey. Presented by T. A. Conrad.

Several post-pliocene fossils, from the Ohio river. Presented by W. M. Gabb.

Bituminous coal. Texas. Presented by Dr. Moore.

Dec. 6*th.* 5 specimens ores of zinc, 1 fossil. Lehigh and Monroe Co., Pa. Presented by W. Thos. Roepper.

1 Pustorius noveboracensis. Philadelphia. Presented by Horatio C. Wood.

Iron ore. Lake Superior. Sciurus Carolinensis. Rock Island Co. Presented by Mr. Sergeant.

Coal plant. Tamaqua, Pa. Presented by Wm. M. Gabb.

Dec. 13*th.* 18 species of land and fresh-water shells of the United States. Presented by W. G. Binney,

Dec. 20*th.* 3 mounted birds. Presented by John Krider.

Specimen of "Millerite" from Gap Mines. Presented by John Williams.

Specimen of "Gold ore," from Kelly's Lead, 2 miles S. of Russell's Gulch, Jefferson Territory, (head of Elkhorn.) Presented by A. G. Reed, Mo.

Snake, from Indiana. Presented by Isaac Lea.

Bugula, Halichondrium, ova of a mollusk, from Newport, R. I. Presented by Messrs. Bridges, Leidy and Powel.

Gorgonia, from Mazatlan. Presented by Dr. Engelmann.

Collection of cretaceous fossils from near Santa Fé, New Mexico. Presented by Chas. M. Wheatley.

Donations to Library—1859.

January 4th, 1859. Natural History of the Amphivinidæ, with Remarks and Observations on Organic Science, Physiology, Crocodilian Hibernation, and Instinct. By Bennet Dowler, M. D. From the Author.

On Marcou's Geology of North America. By Prof. Agassiz. Reply to the same. By J. D. Dana. From J. D. Dana.

Eleventh Annual Exhibition of the Maryland Institute. Baltimore, 1858. From the Institute.

Proceedings of the American Antiquarian Society. October 21, 1858. From the Society.

On the Microscopical Structure of Crystals. By H. C. Sorby. London, 1858. From the Author.

Norton's Literary Letter. 1859. No. 3. From C. B. Norton.

Sixth Supplement to Dana's Mineralogy. From Prof. Dana.

Cotton Cultivation in Africa. By B. Coates. From the Author.

United States Exploring Expedition. During the years 1838–42, under command of Charles Wilkes, U. S. N. Vol. 8. Mammalogy and Ornithology. By Jno. Cassin. With a Folio Atlas. Philada., 1858. From the Author.

American Geology. By Jules Marcou. Zurich, 1858. From the Author.

Beiträge zur Triasischen Fauna und Flora der Bituminasen Schiefer Von Raibl. Von Dr. H. G. Bronn. Stuttgart, 1858. From Dr. J. Leidy.

The following were presented by Dr. T. B. Wilson, on the usual conditions:

De la Pluralité des Races Humaines. Par G. Pouchet. Paris, 1858.

Essai sur l' Inegalité des Races Humaines. Par M. A. De Gobineau. 4 vols. Paris, 1853–55.

Untersuchungen sur Naturlehre der Menschen und der Thiere. Herausg. Von J. Moleschott. Bd. 1, Heft. 1, 2, 3; Bd. 2, Heft. 1, 2, 3; Bd. 3, Heft. 1, 2, 3; Bd. 4, Heft. 1, 2, 3, 4; Bd. 5, Heft. 1, 2.

Dr. A. Th. V. Middendorfs. Sibirische Reise. Bd. 1. Th. 1, Klimatologie, Geognosie; Th. 2, Botanik; Bd. 2, Th. 1, Wirbellose Thiere; Th. 2, Wirbelthiere; Bd. 3, Th. 2, Über die Sprache der Jakuten.

Étude Générale du Groupe des Euphorbiacées. Par M. H. Baillon. Paris, 1858. 1 vol. and Atlas.

Histoire de l' Organisation, du Developpement des Mœurs et des Rapports Zoologiques du Dentale. Par F. J. H. Lacaze-Duthiers. Paris, 1858.

Physiologische Untersuchungen über das Sehen mit Zwei Augen. Von Dr. P. L. Panum. Kiel, 1858.

Skandinaviens Fiskar. Af. W. Von Wright, med. text af. B. Fr. Fries och C. U. Ekström. 1–10 Häfter. Stockholm, 1836–1857.

Geology of North America. By Jules Marcou. Zurich, 1858.

Beiträge zu einer Malacozoologia Rossica. Von Dr. A. Th. von Middendorff. Abthei. 1–3. St. Petersburgh, 1847–49.

Dié geognostischen Verhältnisse Neu-Granadas. Von H. Karsten. Wien, 1856.

Die Conchylien des Manzer Tertiärbeckens. Von Dr. F. Sandberger. 1ste Lief. Wiesbaden, 1859.

Reptilien aus der Steinkohlen-Formation in Deutschland. Von H. von Meyer. Cassel, 1857.

Des Appareils Electriques des Poissons Electriques. Par A. J. Jobert, (Dr. Lamballe.)

Centurie de Lépidoptêres de l' Ile de Cuba. Par Ph. Poey. 2 Decades. Paris, 1832. From M. W. Collet.

Journal of the Academy of Natural Sciences of Philadelphia. New Series, vol. 4, part 1. From the Publication Committee.

January 11*th*. American Journal of Pharmacy. January, 1859. From the Editor.

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Charleston Medical Journal and Review. January, 1859. From the Editor.

Notices of Insects that are known to form the Bases of Fungoid Parasites. From the Author.

The following were presented by Dr. T. B. Wilson, on the usual conditions:

Handbuch des oryktognostischen Theils der Mineralogie. Von J. F. W. Widenmann. Leipzig, 1794.

Nicolai Klimii Iter Subterraneum, etc. Hafniæ et Lipsiæ, 1766.

La Création du Monde. Par un Australien. 1816.

De danske Östersbanker. Af H. Kröyer. Kjöbenbavn. 1837.

Aus der Natur. 11. 1858.

Über einige Farngattungen. Von Dr. G. Mettenius. 2. Plagiogyria. 3. Über die mit einem Schleier Versehenen arten von Pteris. 4. Phegopteris und Aspidium. Frankfurt, A. M., 1858.

Ueber den Bau und die Entwickelung Parasitischer Crustaceen. Von Dr. C. Claus. Cassel, 1858.

Die Silurische Fauna des Unterharzes. Von C. Giebel. Berlin, 1858.

Meletemata Entomologica. Fasc. 3, 4, 5. Petropoli, 1846.

Planches Coloriées des Oiseaux de la Belgique et de leurs Œufs. Par Ch. F. Dubois. 108, 109. Livr.

Systematisches Conchylien-Cabinet Von Martini und Chemnitz. 7 Bd. Heft. 7.

Novitates Conchologicæ. 1857, 10 Lief. 1858, 2 Abthei., 1 Lief.

Mittheilungen aus Justus Perthes' Geographischer Anstalt. Von Dr. A. Petermann. 1858. No. 10.

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January 18*th*. New York Journal of Medicine. January, 1859. From the Editor.

New Orleans Medical and Surgical Journal. November, 1858. From the Editor.

Notes on American Land Shells. No. 4. By W. G. Binney. From the Author.

Report of the North Carolina Geological Survey. By Ebenezer Emmons. Raleigh, 1858. From the Author.

Annual Report of the Board of Regents of the Smithsonian Institution. Washington, 1858. From the Institution.

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Two Memoirs on the Ferns, Flowering Plants and Land Shells of Madeira and Porto Santo. By R. T. Lowe, M. A. London, 1851.

Hanbuch der Conchyliologie und Malacozoologie. Von Dr. Philippi. Halle, 1853.

Fünftes Supplement zu dem Handwörterbuch des Chemischen Theils der Mineralogie. Von C. F. Rammelsberg. Berlin, 1853.

A Journey through Norway, Lapland and part of Sweden. By the Rev. R. Everest. London, 1829.

Aristotelis Stagiritæ Libri Omnes, etc. T. 4. 1580.

Catalogue des Oiseaux Composant le Cabinet de M. le Comte de Riòcour. Nancy, 1829.

Sketch of the Natural History of Yarmouth and its neighborhood. By C. and J. Paget. Yarmouth, 1834.

Catalogo dei Coleopteri della Lombardia. Comp. dai A. E. G. Battista Villa. Milano, 1844.

Museum Heineanum. 1 Theil, die Songvögel enthaltend. Halberstadt, 1850–51.

Degli Uccellé Liguri Notizie raccolte dal Marchese. C. Durazzo. Geneva 1840.

Catalogus Coleopterorum Europæ. 4 Auflage. Berlin, 1852.

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Indicis Generum Malacozoorum. Supplementa et Corrigenda. Auc. A. N. Herrmannson. Cassellis, 1852.

C. Linnæi Systema Naturæ. Leipsiæ, 1748.

Natuur en Ontleedkundige Opmerkingen over den Chameleon: door. W. Vrolik. Amsterdam, 1857.

Disertazione sopra le fisiche e vere cause dé Terremoti del Sig. de Scotti di Cassano. Praga, 1788.

Traité de l'Éducation des Abeilles. Par M. de Frarière. Paris, 1843.

Anleitung zum Ausstopfen und Aufbewahren der Vögel und Säugethiere. Von G. Pistorius. Darmstadt, 1799.

Der Kukuk. Von Dr. A. J. Lottingers. Strassburg, 1776.

Parasitæ corporis humani Interuæ. A. J. C. Zenker. Leipsiæ, 1827.

Specimen Faunæ Insectorum Lipsicæ. A. G. B. Schmeidlein. Leipsiæ, 1790.

Observations addressed to the Coal Owners of Northumberland and Durham. By T. J. Taylor. New Castle, 1846.

Cenno sui Molluschi Vivente e Fossili della Sicilia di P. Calcara. Palermo, 1845.

Synopsis of the Edible Fishes at the Cape of Good Hope. By L. Pappe, M. D. Cape Town, 1853.

February 1*st*. Journal de l'Instruction Publique. Vol. 2. Nos. 11, 12. From M. Huguet Latour.

Canadian Naturalist and Geologist. December, 1858. From the Natural History Society of Montreal.

Annales des Mines. 5 Série; T. 13; 2e Livr. de 1858. From the Minister of Public Works.

Transactions of the Albany Institute. Vol. 4. Part 1. From the Institute.

Denkschrift zur feier des Zehnjœhrigen. Stiftungsfestas des Vereins Deutscher Ærzte in Paris. From the Union.

The Geology of Pennsylvania. By H. D. Rogers. Vol. 1. Philadelphia, 1858. Also, Geological Maps of the State of Pennsylvania, constructed from original surveys, &c., under the superintendence of H. D. Rogers. From the Secretary of the Commonwealth of Pennsylvania.

The following were presented by Dr. T. B. Wilson, on the usual conditions:

Revue et Magasin de Zoologie. 1858. No. 10.

Archives des Sciences Physiques et Naturelles. 1858. No. 11. Genève.

Prodromus Systematis Naturalis Regni Vegetabilis, etc. Auc. A. De Candolle. Pars 14.

Comptes Rendus. 1858. Nos. 19, 20, 21, 22.

L'Organisation du Règne Animal. Par Émile Blanchard. Livr. 24, 25, 26.

Description des Animaux sans Vertèbres découverts dans le Bassin de Paris. Par G. P. Deshayes. 17 et 18 Livr.

Encyclopédie d'Histoire Naturelle. Par le Dr. Chenu. Mammals, 5 vols.; Botany, 2 vols.; Birds, 3 vols. and 2 livr.; Reptiles and Fishes, 1 vol.

Untersuchungen über die Entwicklungs geschichte der Geburtshelferhræte. Von C. Vogt. Solothurn, 1842.

G. A. Langguthii Opuscula Historiam Naturalem Spectantia, etc. Wittebergæ, 1784.

Map of the Territory of the United States, from the Mississippi to the Pacific Ocean, &c. From Lieut. G. K. Warren.

February 8*th*. Canadian Journal of Industry, Science and Art. January, 1859. From the Canadian Institute.

Verslagen en Mededeelingen der Koninklijke Akademie van Wetenschappen.

Afdeeling Setterkunke. 3 Deel; 1, 2, 3, Stuk; 7 Deel, 1, 2, Stuk. Afdeeling Natuurkundes, 7 Deel, 3 Stuk. From the Academy.

Verhandlungen des Zoologisch-botanischen Vereins in Wien. Bd. 7. 1857. From the Society.

Catalogus van de Boekerij der Koninklijke Akademie van Wetenschappen. 1 Deels, 1 Stuk. From the Academy.

Jaarboek van de Koninklijke Akademie van Wetenschappen. April, 1857–April, 1858. From the Academy.

Tidschrift voor Indische Taal. Landen Volkenkunde, Uitgegeven door het Batąviaasch Genootschap van Kunsten en Wetenschappen, onder redaktie van P. Bleeker, J. Munnich en E. Netscher. Jaargang 2, Afler. 1, 2, 3, 4, 5, 6; Nieuwe Serie, Deel 1, Aflev. 1, 2, 3, 4, 5, 6; Deel 2, Aflev. 1, 2, 3, 4, 5, 6. From the Society.

Archiv fûr Naturgeschichte. 23 Jahr., 5 Heft. 24 Jahr., 1 Heft. 32 Jahr., 6 Heft. From the Editor.

43 Jahresbericht der Naturforschenden Gessellschaft in Emden. 1857. Von Dr. H. Metger. From the Society.

Kleine Schriften der Naturforschenden Gesellschaft in Emden. Beiträge zur Kenntniss des Klima's von Ostfriesland. Von Dr. M. A. F. Prestel. From the Society.

Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefakten-kunde. 1858. 4 Heft. From H. G. Bronn.

Verhandlungen der Naturforschenden Gesellschaft in Basel. 2 Theil. 1tes Heft. From the Society.

Berichte über die Verhandlungen der Königlich Sächsischen Gesellschaft der Wissenschaften zu Leipzig. Mathematisch, Physische Classe 1857, 2, 3; 1858, 1. From the Society.

Zeitschrift der Deutschen geologischen Gesellschaft. 9 Bd., 4 Heft. 10 Bd., 1 Heft. From the Society.

Oversight over det Kongelige danske Videnskabernes Selskabs Ferhandlinger og dets Medlemmers Arbeider i Aaret, 1857. From the Society.

Bulletin de la Societé Impériale des Naturalistes de Moscou. 1857. Nos. 2, 3, 4. 1858. No. 1. From the Society.

Verhandelingen der Koninklijke Akademie van Wetenschappen. Deel, 4, 5, 6. From the Academy.

Bulletin de la Société Vaudoise des Sciences Naturelles, T. 5. Bull. No. 41.

Jahrbuch der Kaiserlich. Königlichen Geologischen Reichsanstalt. 1857, Nos. 2, 3, 4. From the Institute.

Giornale dell' I. R. Institute Lombardo di Scienze, Lettre ed Arti e Biblioteca Italiana. Fascic, 47–54. From the Institute.

Atti dell' I. R. Instituto Lombardo di Scienze, Lettre ed Arti. Vol. 1, Fascic 1–5. From the Institute.

Theorie der Sonnenfinsternisse und Verwandten Erscheinungen. Von P. A. Hanson. Leipzig, 1858. From the Author.

Elektrische Untersuchungen von W. G. Hankel. Leipzig, 1858. From the Author.

Bijdragen tot de Dierkunde rietgegeven door het Koninklijk Zoologisch Genootschap Natura Artis Magistra te Amsterdam. 7 Afler.

March 8th. Twenty-sixth Annual Report of the Managers of the Pennsylvania Institution for the Instruction of the Blind. Philadelphia, 1857. From the Managers.

Reply to the "Statement of the Trustees" of the Dudley Observatory. By B. A. Gould, Jr. Albany, 1859. From the Author.

American Journal of Science and Arts. March, 1859. From the Editors.

Charleston Medical Journal and Review. March, 1859. From the Editor.

Proceedings of the Essex Institute. Vol. 2, part 1. 1856–57. From the Institute.

Twenty-fourth Annual Report of the Board of Directors of the Young Men's Mercantile Library Association of the City of Cincinnati. From the Directors.

Report of the Twenty-sixth Exhibition of American Manufactures, held in the City of Philadelphia, from October 15th to November 13, 1858. By the Franklin Institute. From the Institute.

Catalogue of the Officers and Students of the State University of Michigan, for 1859. From the officers of the University.

Canadian Journal of Industry, Science and Art. November, 1858. From the Editors.

The Historical Magazine. May, 1858. From Col. Graham.

Southern Medical and Surgical Journal. Feb., 1859. From the Editors.

Journal of the Society of Arts. London. Vol. 6. Nos. 280–284. From the Society.

Journal of the Indian Archipelago. Vol. 2. No. 4. From the Editor.

Annales des Mines. 5 Sér., T. 13. 3e Liv'r. de 1858. From the Minister of Public Works of France.

Collection of Autograph Letters. From Geo. M. Connaroe.

Journal of Education. Vol. 2. No. 12. From M. Huguet Latour.

Cabinet d'Antiquitées Américaines a Copenhague. Rapport Ethnographique. Par C. C. Rafn. Copenhague, 1858. From the Royal Society of Northern Antiquities.

Sur la Construction des Salles dites des Geants. Par S. M. le Roi Frédéric VII de Denmark. From the same.

The Discovery of America by the Northmen. The same in Spanish. From the same.

An Address on the Life and Character of James Deane, M. D. By H. J. Bowditch, M. D. Greenfield, 1858. From the Author.

The Medicinal, Poisonous and Dietetic Properties of the Cryptogamic Plants of the United States. By F. P. Porcher, M. D. New York, 1854. From S. Austin Allibone.

Address by Richard Owen, M. D., &c. From S. Austin Allibone.

Synopsis of the Report of Zoophytes of the U. S. Exploring Expedition around the world. By J. D. Dana. From the Author.

On the Classification and Geographical Distribution of Crustacea. By J. D. Dana. Philadelphia, 1853. From Dr. R. Bridges.

The following were presented by Dr. Joseph Leidy:

Catalogue of Plants growing without cultivation in the counties of Monmouth and Ocean, in the State of New Jersey. By P. D. Knieskern, M. D.

Synopsis of a Course of Lectures on Mineralogy. By F. Hall. Washington, 1836.

Description of the Family of Animals now extinct, but known to the scientific world under the appellation of Hydrachen, etc. By Dr. A. Kock. New Orleans, 1353.

Recherches sur la Structure des Organes de l' Homme et des Animaux les plus conneus. Par C. F. Boucher. Paris, 1848.

Abhandlungen aus dem Gebiete der Physiologie und Pathologie für Aerzte und Naturforscher von Dr. P. F. H. Klencke. Leipzig, 1848.

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The following were presented by Dr. T. B. Wilson, on the usual conditions:

Zoological Sketches. By Joseph Wolf. Edited with notes by D. W. Mitchell.

The Mammals of Australia. By J. Gould. Part 10.

Monograph of the Trochilidæ, or Humming Birds. By J. Gould. Parts 15, 16.

Monograph of the Trogonidæ or Trogons. By J. Gould. Part 1.

Birds of Asia. By J. Gould. Part 10.

Bonplandia. 6 Jahr., Nos. 10–22.

Comptes Rendus. T. 47. Nos. 23–26.
Die Natur. 1858. Nos. 47–52.
Naturwissenschaftlicher Literaturblatt. Nos. 7, 8.
Kosmos. 1858. Nos. 11, 12.
Traité de Fauconnerié. Par H. Schlegel and J. A. Derster van Wulverhorst Livraison 3. Leide, 1853.
Journal of the Franklin Institute. February, 1859.
London Athenæum. December, 1858.
Journal für Ornithologie. Von Dr. Jean Cabanis. 1858. 5 Heft.
Revue et Magasin de Zoologie. 1858. No. 11.
Archives des Sciences Physiques et Naturelles. 1858. No. 12.
Archives Entomologiques. Par M. James Thomson. 17e Livraison.
Planches Coloriées des Oiseaux de la Belgique et de leurs Œufs. Par Ch. F. Dubois. 110–111 Livraison.
Synopsis des Échinides Fossiles. Par E. Desor. Paris, 1858. Planches, 6me et derniere Livraison.
Wiener Entomologische Monatschrift. 2 Bd.
Bryologia Javanica. Fasci. 12.
Zeitschrift für Wissenschaftliche Zoologie. 9 Bd. 4 Heft.
Biographisch-Literarisches Handwörterbuch zur Geschichte der Exacten Wissenschaften. Von J. C. Poggendorff. Leipzig. 1859.
Iconographie der Land-und Süsswasser Mollusken Europa's. Von E. A. Rossmässler. 3 Bd. 5 und 6 Heft.
Mittheilungen aus Justus Perthes' Geographischer Anstalt, etc. 1858. No. 11.
Das Gebis der Schnecken. Von Dr. F. H. Troschel. 3 Lieferung. Berlin, 1858.

March 15th. Canadian Naturalist and Geologist. February, 1857. From the Natural History Society of Montreal.
Proceedings of the Boston Society of Natural History. Vol. 6, pp. 401–431. From the Society.
Report of the present state of the knowledge of the Entomological Fauna of St. Petersburgh and its environs. By Baron R. Osten Sacken. From the Author.
American Journal of Pharmacy. March, 1859. From the Editor.
New Orleans Medical and Surgical Journal. March, 1859. From the Editors.
Proceedings of the American Antiquarian Society, at a special meeting, held in Worcester, February 10th, 1859. From the Society.
Journal of the Franklin Institute. March, 1859. From Dr. T. B. Wilson, on the usual conditions.
New York Journal of Medicine. March, 1859. From the Editor.
An Apology for the Doctrine of Pythagoras, as compatible with that of Jesus Christ; being a defense of the new sect of Christians. By the Hon. Foreign Secretary to the Animals' Friend Society. Boulogne sur Mer, 1858–9. From the Author.
Report on the History and Progress of the American Coast Survey, up to the year 1858. By the Committee of Twenty, appointed by the American Association for the Advancement of Science, at the Montreal Meeting, August, 1857. From the Committee.
Mountains of North Carolina and Tennessee. By S. B. Buckley. From the Author.
Southern Medical and Surgical Journal. March, 1859. From the Editors.
History of the Fishes of Massachusetts. By D. Humphrey Storer. Pp. 131-194. From the Author.
13 Topographical Maps. From Lt. Col. J. D. Graham, U. S. Top. Engineers.
The following were presented by Dr. T. B. Wilson, on the usual conditions:
The Farmers' Almanac and Calendar, for 1853, 1854, 1855 and 1856.

Beiträge zur Entomologie, Herausg. Von den Mitgliedern der Entomologische Section der Schlesischen Gesellschaft für Vaterländische Kultur. 1s Heft. Breslau, 1829.

De Vermibus in Circulatione Viventibus. Auc. F. J. Schmitz. Berolini. 1826.

Entomologia Schalarum in usus concinnata. Hanoviæ, 1784.

Physiologus Syrus seu Historia Animalium 32. in s. s. mem., Syriace, e codice bib. Vaticanæ nunc primum edidit, verbit et illustravit O. G. Tychsen. Rostochii, 1795.

Sammlung vermischter Abhandlungen zur Aufklärung der Zoologie und der Handlungsgeschichte. Von J. G. Schneider. Berlin, 1784.

Naturgeschichte der Schlesisch-Lausitzchen Amphibien. Von J. C. Neumann, Görlitz, 1831.

Observationes de Oestro Ovine atque Bovino factæ. A. J. L. Fischer. Leipsiæ, 1788.

Die Thierwelt. Leipzig, 1841.

Prospetto Storico-Fisico degli scavi di Ercolaus e di Pompei. Di G. d'Ancora. Napoli, 1803.

Notice sur le Phlocerus. Par G. Fischer de Waldheim. Moscou, 1833.

Uber die Ausarbeitung einer Fauna des Erzherzogthumes Oesterreich. Von L. J. Fitzinger.

Ornithologiskt System. Af C. J. Sundevall.

Beobachtungen über jährlich peviodisch wiederkehrende Erscheinengen im Thier, und Pflanzenreich. Von H. Werner. Tübingen, 1831.

System des Thier Reiches. Von Dr. F. J. C. Mayer. Bonn, 1849.

Die Vertebraten Württembergs. Von F. Berge.

April 5th. Proceedings of the American Philosophical Society. Vol. 6. No. 60. From the Society.

Address by Richard Owen. From the Author.

Additional Notes on the Post-Phocene Deposits of the St. Lawrence Valley. By J. W. Dawson. Montreal, 1859. From the Author.

Directions for collecting, preserving and transporting Specimens of Natural History. Prepared for the use of the Smithsonian Institution. 3d Edition. Washington. March, 1859.

Proceedings of the American Association for the Advancement of Science. 12th Meeting. Cambridge, 1859. From the Association.

Narrative of the Expedition to the River Niger in 1841. By Capt. Wm. Allen and T. R. H. Thomson, M. D. London, 1848. 2 vols. From Dr. Joseph Leidy.

Military Map of Nebraska and Dakota. By Lieut. G. K. Warren. From the Author.

Catalogue des Insectes Coléoptères recueillis par M. G. Osculati, pendant sur exploration de la région équatoriale, sur les bords du Napo et de l'Amazone. Par M. F. E. Guérin. Ménéville.

Meletemata Entomologica. Auc. Dre. F. A. Kolenati. Fasc. 7. Homoptera Stridulantia Caucasi, etc. Mosquæ, 1857.

Separatabdruch naturwissenschaftlicher Abhandlungen aus den Schriften des Zoologisch-botanischen Vereins in Wien, 1856. From the Union.

Uebersicht der naturhistorische Beschaffenheit des Herzogthums Nassau. Von Dr. G. Sandberger. Weisbaden, 1857. From the Author.

Tijdschrift voor Indische Taal-Land-en Volkenkande-Niéuwe Serie. Deel 3, Aflev. 1, 3, 4, 5, 6. From the Batavian Society of Sciences.

5de Opgare van Boekwerken waarmede de Bibliotheek van het Bataviaasch Genootschap van Kunsten en Wetenschappen is Verrijkt. From the Society.

Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen. Deel. 26. From the Society.

The following were presented by Dr. T. B. Wilson, on the usual conditions:

Broylogia Javanica. Fasc. 13–15.

Conchylien Cabinet. Lief. 164.
Conchologia Iconica. Parts 166–182.
Geographische Mittheilungen, etc. 1858. No. 12.
Hewitson's Exotic Butterflies. Parts 28, 29.
Owen's British Fossil Reptiles. Part 6.
Oiseaux de Belgique par Dubois. Livr. 112–113.
Adam's Genera of Recent Mollusca. Parts 34, 35, 36.
Memoirs of the Geological Survey of Great Britain. Decade 9.
Flora Indiæ Batavæ. Vol. 1, part 2, fasc. 1.
Journal de Physiologie. No. 4.
Pfeiffer's Monog. Heliceorum Viventium. Vol. 4. Part 1.
London, Edinburgh and Dublin Philosophical Magazine. Supplementary number completing the volume for 1858.
Revue et Mag. de Zoologie. 1858. No. 12.
Malacozoologische Blatter. Bogen 5–6. Bd. 5.
Quarterly Journal of Microscopical Science. No. 26.
Memoires sur la famille du Fougères. Livr. 7, 8, 9.

April 12th. Southern Medical and Surgical Journal. April, 1859. From the Editors.
Leçons sur la Physiologie et l'Anatomie Comparée de l' Homme et des Animaux. Par H. Milne Edwards. Paris, 1857–9. T. 1, 2, 3, et 4, 1re partic. From Celedonio Carbonell.
Smithsonian Contributions to Knowledge. Vol. 10. City of Washington, 1858. From the Smithsonian Institution.
Compendio Storico della Scuola Anatomica di Bologna Scritto da Michele Medici. Bologna, 1857. From the Municipality of Bologna.
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Journal of the Franklin Institute. April, 1859.
Planches Coloriées des Oiseaux de la Belgique et de leurs œufs. Par Ch. F. Dubois. 114, 115 Livr.
Trésor des Livers Rares et Précieux. Par J. G. T. Graesse. 4me Livr.
Die Conchylien des Mainzer Tertiärbeckens. Von Dr. F. Sandberger. 2e Lief.
Archiv für Anatomie, Physiologie und Wissenschaftliche Medicine. 1858. Heft 5. Bogen 29–34.
Beiträge zur naeheren Kenntniss der Urweltlichen Sæugthiere. Von Dr. J. J. Kaup. 4tes Heft.
Iconographie des Pigeons, etc. Par C. L. Bonaparte, Paris, 1857.
Quarterly Journal of the London Geological Society. No. 57. From the Society.
Address delivered at the Anniversary Meeting of the Geological Society of London. By Major General Portlock. London, 1858. From the Author.

May 3d. On Measurements as a Diagnostic means for distinguishing the Human Races. By K. Scherzer and E. Schwarz. From Dr. J. Leidy.
Annals of the Lyceum of Natural History of New York. Vol. 6. Nos. 10–13. From the Lyceum.
American Journal of Pharmacy. May, 1859. From the Editor.
New York Journal of Medicine. May, 1859. From the Editor.
Canadian Naturalist and Geologist. April, 1859. From the Natural History Society of Montreal.
Canadian Journal of Industry, Science and Art. March, 1859. From the Editors.
On the lower Coal Measures, as developed in British America. By J. W. Dawson. From the Author.
Catalogue of Canadian Plants in the Holmes Herbarium, in the Cabinet of the University of McGill College. Prepared by the late Prof. Jas. Barnston. From he Canadian Institute.

Researches into the Phenomena of Respiration. By E. Smith. From the Author.

Observations on Longevity. By B. Dowler, M. D. From the Author.

Reports of Explorations and Surveys to ascertain the most practicable and economical Route for a Railroad from the Mississippi River to the Pacific Ocean. Vol. 9. From the War Department.

The following were presented by Dr. T. B. Wilson, on the usual conditions:

Contributions to Ornithology, for 1852. Parts 5 and 6.

Paléontologie Lombardie ou Description des Fossiles de Lombardie publiée á l' aide de plusieurs savants par l'Abbé Antoine Stoppani. 1858. 3, 4, et 5 Livr.

Systematisches Conchylien-Cabinet von Martini und Chemnitz. 3 Bd. Heft. 30.

Zoologischer Hand-Atlas. Von Dr. H. Burmeister. 2 Lief.

May 10th. Verhandlungen der K. K. Mineralog. Gesellschaft zu St. Petersburg. 1857–1858. From the Society.

Bidrag till Finlands Naturkännedom Etnografioch Statistik, utgifna af Finska Vetenskaps-Sociéteten. Första Andra Fjarde Häftet. From the Society.

Notiser ur Sällskapets pro Fauna and Flora Fennica Förhandlingar. Bihang till Acta Societates Scientiarum Fennicæ. 1848, 1852, 1857. From the Society.

Sveriges Rikes Stadilag öfversättuing pä Finska Språket. Af Ljungo Thomæ; Pä Finska Vatenskaps-Societetens bekostuad utgifven af W. G. Lagus. Helsingfers, 1852. From the Society.

Sveriges Rikes Landslag, Stadfästad af konung Christopher är 1442. Öfversättuing Pä Finska Spräket af Ljunge Thomæ; Pä Finska Vetenskaps Societetens bekostuad utgifven af W. G. Lagus. From the Society.

Commentationes Societates Scientiarum Fennicæ. T. 1. From the Society.

Acta Societates Scientarium Fennicæ. Tomi 1, Fascic, 2, 3; T. 2, Fascic, 1, 2, 3, 4; T. 3, Fascic, 1, 2; T. 4; T. 5, Bascic, 1, 2. From the Society.

Palæontologie Suedrusslands. Von Dr. A. von Nordman. 1, 2, Taf. 1–12. From the Finnish Society of Sciences.

Öfversigt af Finska Vetenskaps-Societetens Förhandlinger, 1–4. From the Society.

Observations faites à l' Observatoire Magnétique et Météorologique de Helsingfors sous la direction de J. J. Nervander, 1–4. Helsingfors, 1850. From the same.

Mémoires de l' Académie Impériale des Sciences, Arts and Belles-Lettres de Caen. 1856–1858.

Mémoires de la Société Impériale des Sciences Naturelles de Cherbourg. T. 5. From the Society.

Recueil des Actes de l' Académie Impériale des Sciences, Belles-Lettres et Arts de Bordeaux. 20éme Année. 1858. 1–2. From the Academy.

Zeitschrift für die Gesammten Naturwissenschaften-Herausg. von dem Naturw. Vereine für Sachsen u. Thüringen in Halle, redigirt von C. Giebel und W. Heintz. Jahrgang, 1858. Elfter Bd. Berlin, 1858. From the Union.

Jahrbücher des Vereins für Naturkunde im Herzogthum Nassau. Herausg. Von C. T. Kirschbaum. 12 Heft. From the Union.

Observations sur les Mœurs de Divers Oiseaux du Mexique par H. de Saussure. From the Author.

Mittheilungen aus dem Osterlande. 14 Bd. 1, 2, Heft.

Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefakten-Kunde. Herausg. Von K. C. von Leonhard und H. G. Bronn. 1858. 5 Heft. From the Editors.

Die Entwickelung der organischen Schöpfung. Von H. G. Bronn. From the Author.

Bulletin de la Société Vaudoise des Sciences Naturelles. T. 6. No. 43. From the Society.

Die Rhynchoten der Gegend von Weisbaden. Von C. L. Kirschbaum. 1 Heft. From the Author.

Die Athysanus Arten der Gegend von Weisbaden. Von C. L. Kirschbaum. Weisbaden, 1858. Der Wetterauer Gesellschaft für Naturkunde zur Feier ichres fünfzigjährigen Restehens am 11 Aug. 1858, etc. Both from the Society.

Die Leitflanzen des Rothliegenden und des Zechsteingebirges oder der permischen Formation in Sachsen. Von Dr. H. B. Geintz. Leipzig, 1858. From Dr. J. Leidy.

Mathematische Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin, 1857. Physikalische Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin, 1857. Both from the Academy.

Abhandlungen. herausg. von der Senckenbergischen Naturforschenden Gesellschaft. 2 Bdes. 2 Lief. From the Society.

Verhandlungen des Vereines zur Beförderung des Gartenbaues in den Königlich Porussischen Staaten. 4 Jahr., 3 Lief.; 5 Jahr., 2 Heft. From the Union.

Monatsbericht der Königlichen Preuss. Akad. der Wissenschaften zu Berlin, 1857. Sept., Oct., Nov., Dec., 1858, Januar, Februar, März, April, Mai, Juni. From the Academy.

Archiv für Naturgeschichte. Herausg. Von Dr. F. H. Troschel. 24 Jahr., 2 Heft. From the Editor.

Zeitschrift der Deutschen Geologischen Gesellschaft. 10 Bd., 2 Heft. From the Society.

Öfversigt af Kongl. Vetenskaps-Akademie Förhandlingar. 14 Ärgängen. 1857. From the Academy.

Kongl. Svenska Uetenskaps. Akademiens Handlinger. Bd. 1, Häft. 2. 1856. From the Academy.

Kongl Svenska Fregatten Eugenies resa omkring Jorden-under befäl af C. A. Virgin Aren 1851–1853. Botanik 1, Zoologie, 1, 2. From the same.

London Journal of the Society of Arts. Vol. 7. Nos. 306 to 323. From the Society.

Memoirs of the Literary and Philosophical Society of Manchester. 2d series. Vols. 13, 14 and 15. Part 1. From the Society.

Proceedings of the Literary and Philosophical Society. 1857. No. 1. From the Society.

Natural History Review. October, 1858. From the Editors.

North American Medico-Chirurgical Review. May, 1859. From the Editors.

Journal of the Geological Society of Dublin. Vol. 8. Part 1. From the Society.

Charleston Medical Journal and Review. May, 1859. From the Editor.

Southern Medical and Surgical Journal. May, 1859. From the Editors.

The Iron Manufacturer's Guide to the Furnaces, Forges and Rolling Mills of the United States, &c. By J. P. Lesley. New York, 1859. From the Author.

Synopsis of the Fresh Water Fishes of the Western portion of the Island of Trinidad, W. I. By Theodore Gill. New York, 1858. From the Author.

Description of a new Generic form of Cobinæ, from the Amazon River. By T. Gill. From the Author.

Description of a new genus of Pimelodinæ, from Canada. By T. Gill. From the Author.

Description of two new species of Terrestrial Crapsoid Crustaceans, from the West Indies. By T. Gill. From the Author.

Prodromus descriptionis subfamiliæ Cobinarum squamis cycloideis piscium, cl. W. Stimpsono in mare Pacifice acquisitorum. T. Gill, auctore. From the Author.

Prodromus descriptionis familiæ Cobioidarum duorum generum novorum. T. Gill, auc. From the Author.

May 17th. Pacific Medical and Surgical Journal. April, 1859. From the Editors.

The following were presented by Dr. T. B. Wilson, on the usual conditions:
Quarterly Journal of Microscopical Science. April, 1859.
Cosmos. Par A. de Humboldt. T. 4. Paris, 1859.
Journal of the Franklin Institute. May, 1859.
Untersuchungen zur Naturlehre des Menschen und der Theire. Herausg. Von J. Moleschott. 5 Bd. 3 Heft.
Malakozoologische Blätter. 5 Bd. 14–15 Bog.
Journal für Ornithologie. 1858. Heft. 6.
Archives Entomologiques. 18 Livr.
Planches Coloriées des Oiseaux de la Belgique et de leurs Œufs. 116, 117 Livr.
Échinides du Département de la Sarthe par Cotteau et Triger. 3 Livr.
Beiträge zur Naturgeschichte der Vorwelt. Von W. Dunker und H. von Meyer. 5 Bd. 5, 6 Lief.; 6 Bd. 6 Lief.
Kosmos. No. 10. 1858.
Zer Fauna der Vorwelt-Reptilien aus dem Lithographischen Schiefer des Jura in Deutschland und Frankreich. Von H. von Meyer. 1 Lief. Frankfurt am Main, 1859.
Engraving of Linnæus in Lapland Dress, 1732. From Dr. J. L. Le Conte.

May 24th. Report of the Geological Survey of the State of Iowa; embracing the results of investigations made during portions of the years 1855, 1856 and 1857. By James Hall and J. D. Whitney. Vol. 1. Parts 1 and 2. From Jas. Hall.
Contributions to the Palæontology of New York. By James Hall. From the Author.
Annales des Mines. 5 Sér. T. 14. 4e Livr. de 1858. From the Minister of Public Works of France.
Memoirs of the Geological Survey of India. Vol. 1. Part 2. Calcutta, 1858.
Essai sur les Soulèvemens Jurrasiques. Par J. Thurmann. 2 Cahier.

June 7th. Mapa de la República de Bolivia, mandado publicar por el Gobierno de la Nacion. Por el Feniente Coronel Juan Ondarza, Comandante Juan Mariano Mujio y Mayor Lucio Camacho. From Juan Ondarza. Ano de 1859.
The Canadian Journal of Industry, Science and Art. New Series. No. 21. For May, 1859. From the Institute.
The Journal of the Society of Arts and of the Institutions in Union. Vol. 7. Nos. 324 to 331 inclusive. From the Society.
Traité Complet de l'Anatomie de l'Homme Comprenant la Médecine Operatoire, par le Docteur J. M. Bourgery, avec planches lithographiées d'apres nature par N. H. Jacof. 6 vols. 4to text, and 7 vols. 4to plates. Paris, 1840. From Mrs. Sarah R. G. Beck.
The following were presented by Dr. T. B. Wilson, on the usual conditions:
Annales des Sciences Naturelles Botanique, Tome 9. Zoologie Tome 9. For 1858.
Exotic Butterflies. By William C. Hewitson. Part 30.
Conchologia Iconica. By Lovell Reeve. Part 183.
Systematisches Conchylien-Cabinet von Martini und Chemnitz. Lieferung 166.
Beiträge zur Palæontographie von Oesterrich von Franz Ritter von Hauer. 1 Band. 2 Heft.

June 21st. Proceedings of the Boston Society of Natural History. Vol. 7th. June, 1859, and title page and index of vol. 6. From the Society.
Southern Medical and Surgical Journal. Vol. 15th. No. 6. June, 1859. From the Editors.

The Medical and Surgical Reporter. New Series. Vol. 2. No. 11. From the Editors.

Proceedings of the American Antiquarian Society, at the semi-annual meeting, in Boston, April 27th, 1959. From the Society.

Quarterly Journal of the Geological Society. London. Vol. 15. Part 2d. May, 1859. From the Society.

Proceedings of the Royal Society of London. Vols. 7 and 8. Nos. 28 to 32 inclusive. For 1857 and 1858, and pages 181 to 411 inclusive, with title page and index for vol. 6. From the Royal Society.

Proceedings of the Belfast Natural History and Philosophical Society. 1859. From the Society.

A new theory of the flight of birds. By R O. Davidson. 8vo. tract. 1858. Washington. From the Author.

List of the known species of Pisidium, with their synonymy. By Temple Prime. 8vo tract. 1858. New York. From the Author.

Reply to the criticisms of James D. Dana. By Jules Marcou. 8vo. tract. Zurich, 1859. From the Author.

The following were presented by Dr. T. B. Wilson, on the usual conditions:

Journal of the Franklin Institute. Vol. 36. June, 1859. No. 6.

Joh. Baptistæ Portæ Neapolitani Magiæ Naturalis Libri viginti Lugd. Batav. 1650.

Joan Ludovice Gansii M. D. Coralliorum Historia. 18mo. Francofurti, 1669.

Claudii Æliani, de animalium naturâ libri 17. 18mo. Lugduni, 1616.

Francisci Redi di animalculis vivis quæ in corporibus animalium vivorum reperiuntur observationes ex Etruscis Latinas fecit Petrus Coste. Amstelaedami 18mo. 1708.

Biblioteca Agraria o sia raccolta di scelti instruzioni economico-rurali diretta dal signor Dottore Giuseppe Moretti. Vol. 7. 12mo. Milano, 1835.

Clavis Rumphiana Botanica et Zoologica, scripsit Aug. Guil. Ed. Th. Henschel, Uatislaviae. 8vo. 1833.

Memoire scientifiche di Paolo Savi Decade Prima 8vo. Pisa, 1828.

Verseichnitz der bisher hinlänglich bekannten Eingeweidewürmer von Franz von Paula Schrank. 12mo. München, 1788.

Journal der Naturwissenschaft und Medezin. Herausgegeben von F. J. Schelvea. 12mo. Frankfurt am Main, 1810. Ersten Bandes, Erstes Stück.

Abhandlungen der Hallischen Naturforschenden Gesellschaft Ersten Band. 8vo. Dessau und Leipzig, 1783.

Geschichte einiger den Menschen Thieren Oekonomie u. Göatnerei schädlicken Insekten nebst den besten mittelugegen dieselben Aus dem Franzoseschen und mit Anmerkungen von J. A. E. Goetze. 8vo. Leipzig, 1787.

2 Record Books for Mammalia and Crania, except human. From J. H. Slack

July 5th. Wiener Entomologische Monatschrift. Bd. 3 Nos. 1 to 6, inclusive, for 1859. From the editors.

Untersuchungen über den Zusammenhang in den Aenderungen der dichten und Brechungs Exponenten in Gemengen von Flusigkeitan und Verbindungen von Gaaen von Alois Handl und Adolf Weiss. 8vo. tract. Wien, 1858. From the authors.

Ueber die Entwickelungs-geschichte und den anatomischen Bau der handförmigen Auswüchse an den Blättern und Stengeln von Gireoudia manicata *Klotsch* von Adolf Weiss. 8vo. tract. Wien, 1858. From the author.

Beitrag zur Kenntniss der Spaltoffnungen von Adolf J. G. Weiss. 8vo. tract. From the author.

Ueber ein neues Vorkommen der Spaltoffnungen und einige andere Bemerkungen über dieselben. Von Adolf Weiss. 8vo. tract. Wien, 1857. From the author.

The following are from Dr. T. B. Wilson on the usual conditions:

Catalogne of Shield Reptiles in the collection of the British Museum, part I. Testudinata. By John Edward Gray. 4to. London, 1855.

Catalogue of Apodal Fish in the collection of the British Museum. By Dr. Kaup. 8vo. London, 1858.

Catalogue of the Coleopterous insects of Madeira in the collection of the British Museum. By F. Vernon Wollaston. 8vo. London, 1857.

Catalogue of the Batrachia Salienta in the collection of the British Museum. By Dr. Albert Günther. 8vo. London, 1858.

Catalogue of the Mammalia and Birds of New Guinea in the collection of the British Museum. By J. E. Gray and G. R. Gray. 8vo. London, 1859.

Guide to the Systematic distribution of Mollusca in the British Museum. By John Edward Gray. 8vo. London, 1857.

Forty-five duodecimo catalogues of Natural History in the collection of the British Museum.

Archiv für Anatomie, Physiologie und Wissenschaftliche Medicin. Von Dr. Johan. Müller. Jahrgang, 1858. Heft 6.

Malakozoologische Blätter, Band 5. Bogen 11–13. 1858.

Bryologia Javanica seu descriptio Muscorum frondosum Archipelagi Indici. Iconibus illustrata. Auctores F. Dozy and J. H. Molkenboer. Fasc. 16. Leyden, 1858. 4to.

Tresor des livres rares et precieux ou nouveau dictionnaire bibliographique. Par Jean George F. Graesse, cinquieme Livr. 4to. Dresden, 1858.

Icones Physiologicæ. Von Alexander Ecker. Vierte lief. 4to. Leipzig, 1859.

Planches Colorieés des Oiseaux de la Belgique et de leurs Oeufs. Par Ch. F. Dubois. 118 and 119 Livraisons.

Archives Entomologiques. Par M. James Thomson. 19 Livraison.

Flora Indiæ Bataviæ, vol. i. part 2. Fascic. 2.

Annales des Sciences Naturelles, Vol. x. Nos. 1 and 2, 1858.

Edinburg New Philosophical Journal. Vol. 8, No. 2, 1858.

London, Edinburg and Dublin Philosoph. Mag. and Journal of Science, No. 13, 14, 15, 21, 22 and 100, fourth series.

Journal of the Royal Asiatic Society of Great Britain and Ireland, Vols. 15 and 16, with 3 maps.

Genera species et Synonyma Candolleana alphabetico ordine disposita. Auctore H. W. Buek, M. D. Pars 1 and 2. 8vo. Berolini, 1842.

July 12th. Neue philosophische Abhandlungen der baierischen Akademie der Wissenschaften, Vols. 7. 4to. München. 1778 to 1797.—Gelehrte Anzeigen, herausgegeben von Mitgliedern der K. bayer. Akademie der Wissenschaften, Vols. 28, 29, 30, 31, 45 and 46. 4to. München, 1849 to 1858.—Abhandlungen der Philosoph. Philologischen Classe der Kön. Bayerischen Akademie der Wissenschaften, 7th Band and 8th Band, 2 and 3 Abtheilung. 4to. and Historischen Classe.—7th Band 2 and 3 Abtheilung and 8th Band, 1st and 3d Abtheilung. —Bulletin der Königl. Akad. der Wissenschaften. Jahrgang, 1844 and 1845.—

Physikalische Abhandlungen der Königl. baierischen Akad. der Wissenschaften, 1st Abtheil. München. 8vo. 1803.—Ueber Johan. Müller und sein Verhältnitz zum jetzigen Standpunkt der Physiologie Von Dr. Th. L. M. Bischoff. 1858.—Annalen der königlichen Sternwarte bei München, 10th Band —Meteorologische Beobachtungen aufgezeichnet an der königl. Sternwarte bei München in den Jahren, 1825–1837.—Ueber neu aufgefundene Dichtungen Francesco Petrarca's. Von Prof. Dr. George Martin Thomas. 4to. tract. München, 1858. —Ueber die geschichtlichen Vorstufen dei Neuern Rechtsphilosophie. Von Prof. Carl. Prantl. München. 4to. tract. 1858. From the Royal Academy of Sciences of Munich.

Württembergische naturwissenschaftliche Jahreshefte. 15th Jahrgang, 1859. 1 and 2 heft. From the Society at Stuttgart.

Jahrbuch der kaiserlich-königlichen Geologischen Reichsanstalt. 11th Jahrgang. Nos. 1, 2 and 3. 1858. Wien. From the Institution at Wien.

Zeitschrift der Deutschen geologischen Gesellschaft. 10th Band, 3d heft, 1859. Berlin. From the Society.

Archiv für Naturgeschichte, 24th Jahrgang. 4th heft. From Prof. Troschel.

Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefaktenkunde. Von Leonhard und Bronn. 1859. 1st heft. From Professors Leonhard and Bronn.

Siebenter Bericht der Oberhessischen Gesellschaft für Natur- und Heilkunde. Giessen. 1859. From the Society.

Correspondenz-Blatt des zoologisch-mineralogischen Vereines in Regensburg. 12th Jahrgang, 1858. From the Society.

Bericht des Naturhistorischen Vereins in Augsburg, 1855, '56, '57 and '58. From the Society.

Linnæa Entomologica, 13th vol., and Entomologische Zeitung, 19th Jahrgang. Von dem Entomologischen Vereine zu Stettin. From the Society.

Description de diverses espèces nouvelles ou peu connues du Genre Scolia. Par H. de Saussure. 8vo. tract. Paris, 1859. From the author.

La Bourgogne, Revue œnologique et viticole. Par C. Ladrey. 1st Livraison., 1859. Dijon. From the Editor.

Memoires de l'Académie Impériale des Sciences, Arts et Belles-Lettres de Dijon. 2d series, Tome 6. 1857. From the Academy.

Memoires de la Société de Physique et d'Histoire Naturelle de Geneve. Tome 14, 2d part. 1858. From the Society.

Novorum Actorum Academiæ Cæsareæ Leopoldino-Carolinæ Naturæ Curiosorum. Vol. 26, pars posterior. Breslau und Bonn, 1858. From the Academy.

Atti dell' I. R. Instituto Lombardo di Scienze, Lettere ed Arti. Vol. 1. 1858. Fasc. 6, 7, 8, 9 and 10. Monumento al Cavaliere Dottore Luigi Sacco eretto nello spedale maggiore per voto e cura dell' Academia Fiscio-Medico-stitistico di Milano. From the Institute.

Le piante fossili dell' Oolite descritte ed illustrate dal Barone Achille de Zigno. Parts 1 and 2. Padua, 1856 and 1858. Folio. From the author.

July 19th. Report of the Superintendent of the Coast Survey, showing the progress of the survey during the year 1859. 4to. Washington. 1858. From Prof. A. D. Bache.

Report of the Commissioner of Patents for the year 1857. Agriculture. 8vo. Washington, 1858. From the Smithsonian Institution.

Annales des Mines. Fifth series. Vol. 14, 3d livr. 1858. From the Minister of Public Works, France.

Prodrome d'une iconographie descriptive des Ophidiens et description sommaire de Nouvelles espèces de serpents venimeux par M. Le Prof. Jan. 8vo. tract. Paris, 1859. From the Author.

Walpers, Annales Botanices Systematicæ. Vol. 5, 1 and 2 parts. Dr. Carolo Mueller. Berlin. From the author.

The Atlantis, a register of Literature and Science. Conducted by members of the Catholic University of Ireland. No. 2, July, 1849, and No. 3, Jan., 1859. From the Editors.

Proceedings of the Boston Society of Natural History. Pages 49 to 54 incl. Vol. 7. From the Society.

Proceedings of Elliott Society of Natural History, Charleston, South Carolina. Vol. 1. From the Society.

Memoirs of the American Academy of Arts and Sciences. New series, Vol. 6, part 2, and Proceedings of the American Academy of Arts and Sciences, Vol. 4, pages 89 to 248 inclusive. From the Academy.

The American Journal of Science and Arts. Vol. 2, No. 82. July, 1858. From the Editors.

The North American Medico-Chirurgical Review. Vol. 1, No. 4. July, 1858. From the Editors.

The New Orleans Medical and Surgical Journal. Vol. 16, No. 4. July, 1859. From the Editors.

The American Journal of Pharmacy. 3d series, Vol. 4, No. 4. July, 1859. From the Editor.

The New York Journal of Medicine. No. 97. July, 1859. From the Editors.

Charleston Medical Journal and Review. Vol. 14, No. 4. July, 1859. From the Editor.

The Druggist, Cincinnati. Vol. 1. No. 23. From the Editor.

The Canadian Naturalist and Geologist. Vol. 4, No. 3. June, 1859. From the Society.

Annual Report of the Board of Regents of the Smithsonian Institution for 1858. From the Institution.

First Report of a Geological Reconnaissance of the northern counties of Arkansas, made during the years 1857 and 1858, by David Dale Owen, principal geologist. 8vo. Little Rock, 1858. From the Author.

Southern Medical and Surgical Journal. Vol. 15, No. 7. July, 1859. From the Editors.

The following are from Dr. Wilson, on the usual conditions:

Conchologia Iconica. By Lovell Reeve. Parts 184 and 185. Columbella and Trochita.

Journal of the Franklin Institute. 3d series, Vol. 38, No. 1. July, 1859.

Traité de Physiologie. Par F. A. Longet. Tome 1, 2d Part. 8vo. Paris, 1859.

The American Journal of the Medical Sciences. No. 75, new series. July, 1859. From the Editor.

August 2d. Annual Report of the Trustees of the New York State Library for 1858. From the Trustees.

Allgemeine Zeitung für Wissenschaft. Wien, No. 1. April, 1859. From the Editor.

Report of the Proceedings of the Geological and Polytechnic Society of the West Riding, of Yorkshire. China and its trade, read by John Crawford, F.R.S., to the Phil. and Literary Society of Leeds, 17th Nov., 1858. Sensorial Vision, read by Sir J. F. W. Herschel, to the Phil. and Lit. Soc. of Leeds, 30th Sept., 1858. Comets, their constitution and phases, by Christopher Kemplay. 8vo. 1849, Leeds. Leeds Philosophical Society's Annual Report for 1857-58. From the Society.

Wiener Entomologische Monatschrift. Band 3, No. 7. July, 1859. From the Editors.

De la formation et de la fécondation des Œufs chez les Vers Nématodes Par Edouard Claparède. From the Author. 4to. Geneve, 1859.

The Gardener's Monthly and Horticultural Advertiser. Vol. 1, No. 6. June, 1859. From the Editor.

Reports of Explorations and Surveys to ascertain the most practical and economical route for a railroad from the Mississippi River to the Pacific Ocean. Vol. 10, 4to. From the War Department.

The Canadian Journal of Industry, Science, and Art. New series, No. 22. July, 1859. From the Institute.

De Kultuur en de bewerking van het Suikerriet. Door C. J. Hering. Vol. 1, 8vo. Rotterdam, 1858. From the Author.

Aug. 9th. The following are from Dr. T. B. Wilson, on the usual condition:

List of the specimens of birds in the collection of the British Museum. By G. R. Gray, F. L. S., &c. Part 3, section 2. Psittacidæ, 12mo. 1859.

List of the specimens of Lepidopterous Insects in the Coll. of the Brit. Mus. By Francis Walker, F. L. S., &c. Part 17. Pyralides. 1859. 12mo.

Histoire Naturelle Générale des Règnes Organiques. Tome 2, part 2. 8vo. Paris, 1859.

Leçons sur La Physiologie et L'Anatomie comparée de L'Homme et des Animaux. Par H. Milne Edwards. Tome 4, 8vo. Paris, 1859.

Annales des Sciences Naturelles comprenant La Zoologie, &c. 4th series, Tome 10, No. 3. 1858.

Naumannia. Journal für die Ornithologie. 2d and 3d Heft. 1858.

Planches colorées des Oiseaux de la Belgique et de leurs Œufs. Par Ch. F. Dubois. 120 and 121 Livraisons.

Orthopädisches Institut. Von J. Heine. 4to. tract. Cannstatt, 1834.

Die Metamorphose der Monaden. Von Dr. A. F. J. C. Mayer. 4to. Bonn, 1840.

Anatomische Untersuchung des Orycteropus Capensis. Von Hermann Freidz. Jäger 4to., tract. Stuttgart, 1837.

Die Wahre Ursache der Baumtrockniss der Nadelwalder durch die Naturgesch. der Forstphaläne (Phalæna Noct. Piniperda,) &c. Von D. J. Johann Andr. Kob. 4to, tract. Nürnberg, 1786.

De Proctostego, novo piscium genere, specimen ichthyologicum. Joan. Dominicus Nardo Patavii. 4to, tract. 1827.

Anatomisch-physiologishe Beobachtungen über die Sagitta bipunctata. Von Dr. August Krohn. 4to, tract. Hamburg, 1844.

Grönlands Amfipoder beskrevne af Henrik Krøyer. 4to, tract. Kiobenhavn, 1838.

Dipterologische Beiträge. Von Dr. H. Loew. 4to, tract. Posen, 1845.

Specimina Zoologica Mosambicana. Fasciculus 4 and 5. 4to. Bononiæ, 1851. J. Joseph Bianconi.

Essai sur le Ver Solitaire de l'Homme. Par Chrétien Kiefer. Strasbourg, 1806. 4to, tract.

Journal of the Franklin Institute. 3d ser., Vol. 38, No. 2. August, 1859.

Aug. 16th. Eleventh Annual Report of the Maryland Institute for the years 1858 and 1859. From the Institute.

The following are from the Imperial Academy of Sciences in Vienna:

Die Principien der heutigen Physick bei der Feier de Ubernahme des ehemaligen Universitäts. Gebäudes von der Kaiserlichen Akadamie der Wissenschaften am 29 October, 1857. Von Dr. Andreas Ritter V. Ettingshausen. Wien ii.

Festrede bei der feirlichen Uebernahme des ehemaligen Universitäts. Gebäudes durch die Kaiser. Akad. der Wissen. gehalten am 29 October, 1857. Von Vice-Präsidenten Dr. Théo. Georg Von Karajan. Wien.

Sitzungsberichte der Kaiserlichen Akad. der Wissen. Mathematisch-Naturwissenschaftliche Classe. Band 24, heft 3. Bands 25 to 32 incl. and Band 33, heft. 1, 2, and 3.

Denkschriften der Kais. Akad. der Wissen. Math. Naturwis. Bänden 14 and 15.

Jahrbücher der K. K. Centralanstalt für Meteorologie und Erdmagnetismus. Von Karl Kreil. Band 5. Jahrgang, 1853.

Almanach der Kaiser. Akad. der Wissenschaften, 1857.

The Microscope Made Easy. By Henry Baker, F. R. S. London. 8vo. 1769. From Dr. James A. Darrach.

August 23d. Southern Medical and Surgical Journal. Vol. 15, No. 8. August, 1859. From the Editor.

On the distribution of the forests and trees of North America, with notes on its physical geography. By J. G. Cooper, M.D. From the Author.

Proceedings of Boston Soc. of Nat. Hist. Vol. 7, July, 1859, pages 65 to 96. From the Society.

Antediluvian Antiquities recently discovered in France and England. From W. F. Kintzing.

September 6th. Thirty-eighth Annual Report of the Mercantile Library Association of New York for 1858–59. From the Association.

Hutching's California Magazine, Nos. 37 and 38, for July and August, 1859. From the Publishers.

Wiener Entomologische Monatschrift. Band 3, No. 8, for Aug. From the Editors.

Fragmenta Phytographiæ Australiæ, contulit. Ferdinandus Mueller. 8vo, Melbourne, 1858–59. Vol. 1. Fasc. 1 to 4. From the Author, through Prof. A. Gray.

Report on the plants collected during Mr. Babbage's expedition into the North-western interior of South Australia in 1858. Fol. tract. Melbourne, 1858. From the Author, through Prof. A. Gray.

Charleston Medical Journal and Review. Vol. 14, No. 5, Sept. 1859. From the Editor.

The American Journal of Pharmacy. 3d ser., Vol. 7, No. 5. Sept. 1859. From the Editor.

On the Geology of the Mayence Basin. By William J. Hamilton. 8vo. tract. London, 1854. Anniversary Addresses before the Geological Society of London, in the years 1855 and '56. By Wm. J. Hamilton. Anniversary Addresses before the Royal Geographical Society, in the years 1848 and '49. By Wm. J. Hamilton, President. From the Author.

Edinburgh New Philosophical Journal. Vol. 9, and Vol. 10, No. 1. July, 1859. From the Editors.

Leopoldina. Amtliches Organ der Kaiserlichen. Leopoldino Carolinischen Deutschen Akademie der Naturforschen. Jena, No. 1, June, 1859. From the Academy.

Études sur les infusiores et les rhizopodes par Edouard Claparède et Johannes Lachmann. Vol. 1, 4to. Genève, 1859. From the Authors.

Anatomie und Entwicklungs-geschichte der Neritina fluviatilis, von Edouard Claparède. 8vo. From the Author.

The following are from Dr. T. B. Wilson, on the usual conditions:

Cyclopædia of Anatomy and Physiology, by Robert Todd. Parts 51 and 52.

Genera, species et synonyma Candolleana, alphabetico ordine disposita seu Index Generalis et Specialis. Auctore H. W. Buek, M.D. Pars 3, 8vo. Hamburg, 1859.

Annales des Sciences Naturelles, comprenant La Zoologie, &c. 4th serie. Tome 10, Nos. 4 and 5, 1858.

Journal für Ornithologie von Dr. Jean Cabanis. Jahr. 6. Sept. 3, May, 1858.

Journal of the Franklin Institute. Sept. 1859, No. 3.

Systematische Conchylien-Cabinet von Martini und Chemnitz, Lieferung, 167.

Ueber die Larven und die Metamorphose der Echinoderm Zweite Abhandlung. Von Joh. Müller, 4to. Berlin, 1849.

Ueber die Larven und die Metamorphose der Holothurien und Asterien Von Joh. Müller, 4to. Berlin, 1850.

Description de Fougères exotiques rares ou nouvelles, par A. L. A. Fee, fascic 6th.

September 13th. Revue et Magasin de Zoologie pure et appliquée. Nos. 1 to 7, 1859. From the Editor.

The American Journal of Science and Arts. Vol. 28, 2d series. Sept. 1859. From the Editors.

New Orleans Medical and Surgical Journal. Vol. 16, No. 5. Sept. 1859. From the Editors.

Southern Medical and Surgical Journal. Vol. 15, No. 9. Sept. 1859. From the Editors.

North American Medico-Chirurgical Review. Vol. 3, No. 5. Sept. 1859. From the Editors.

Charleston Medical Journal and Review. Vol. 14, No. 5. Sept. 1859. From the Editor.

The Dental Cosmos. Vol. 1, No. 2. Sept. 1859. From the Editors.

Journal of the Elliott Soc. of Natural History. Vol. 1, Nos. 1 and 2. From the Society.

Geological Report of the country along the line of south-western branch of the Pacific Railroad. By G. C. Swallow. 8vo. St. Louis, 1859. From the Author.

September 20th. A treatise on problems of Maxima and Minima, solved by Algebra, by Ramchundra. 8vo. London, 1859. From the Hon. Court of Directors of the East India Company.

The Naturalist in Bermuda, a sketch of the Geology, Zoology and Botany of that remarkable group of Islands. By John Matthew Jones, Esq. 8vo. London, 1859. From the Author.

Report of the Joint Committee of the Royal Society and the British Association for procuring a continuation of the Magnetic and Meteorological Observatories. Address of the Rt. Hon. the Lord Wrottesley, &c. &c. &c., Prest. at the Anniversary Meeting of the Royal Society, Nov. 30th, 1858. The Royal Society, Nov. 30th, 1858. Proceedings of the Royal Society, Vol. 9, Nov. 34, 1859. From the Royal Society.

The New York Journal of Medicine. No. 88, Sept. 1859. From the Editors.

October 4th. Annual of Scientific Discovery, or Book of Facts in Science and Art. By David A. Wells. 8vo. Boston. 8 vols. for 1850, '51, '52, '53, '54, '56, '57, '59. From David M. Warren.

Descriptions of and observations on some species of Rhododendron, collected in Assam and Bootan, by Thomas J. Booth. By Thomas Nuttall. 8vo. tract. From the Author.

On collecting, preparing and mounting Diatomaceæ for the Microscope. By Arthur M. Edwards, New York. 8vo. tract. From the Author.

The Canadian Naturalist and Geologist. Vol. 4, No. 4. August, 1859. From the Society.

Walpers, Annales Botanices systematicæ. Vol. 5, Fasc. 2. From the Author.

Wiener Entomologische Monatschrift. Band 3, No. 9. Sept. 1859. From the Editors.

Revue et Magasin de Zoologie pure et appliquée. No. 8, 1859. From the Editor.

Berliner Entomologische Zeitschrift, Dritter Jahrgang, 1859. Erstes Zweites und drittes Vierteljahrsheft. From the Entomological Society.

Bulletin de La Societé Paléontologique de Belgique. Tome Premier, feuilles. No. 1 à 4, 1859. From the Society.

Observations on the Genus Unio. By Isaac Lea, LL.D. Vol. 7, part 1. Philadelphia. From the Author.

Journal of the Academy of Natural Sciences of Philadelphia. New series, Vol. 4, part 2, 1859. From the Publication Committee.

The following are from Dr. T. B. Wilson, on the usual conditions:

Comptes Rendus des Séances et Memoires de la Societé de Biologie. Tome cinquième de la deuxième série, Paris, 1859.

Legons sur La Physiologie et L'Anatomie comparée de L'Homme et des Animaux, par H. Milne-Edwards. Tome cinquième première partie. 8vo. Paris, 1859.

Archives Entomologiques, par James Thomson, 20th Livr. Paris, 1858.

Annales des Sciences Naturelles comprenant la Zoologie la Botanique, &c. Tome 10, No. 6. 1858.

Naumannia Journal für die Ornithologie, Jahrgang, 1858. Viertes bis sechstestheft.

Elements of Botany, or outlines of the Natural History of Vegetables. By Benj. Smith Barton, M.D. 8vo. Philadelphia, 1803. From Dr. Thomas Betton.

October 11th. The Quarterly Journal of the Geological Society. Vol. 15, No. 59, Part 3d. August 1st, 1859. From the Society.

Proceedings of the American Philosophical Society. Vol. 7, No. 61. Jan. to June, 1859. From the Society.

Southern Medical and Surgical Journal. Vol. 15, No. 10. October, 1859. From the Editors.

The Dental Cosmos. Vol. 1, No. 3. October, 1859. From the Editors.

The Architect's and Mechanic's Journal. Vol. 1. No. 13. October, 1859. From the Editor.

Estatutos de la Sociedad de Naturalistas Neo-Granadinos. From the Society.

D. Marcus Elieser Bloch's Abhandlung von der Erzeugung der Eingeweidewürmer und den Mitteln wider dieselben. 4to. Berlin, 1782. From Dr. Fricke.

Geological sketch of the Estuary and Fresh water deposit forming the bad lands of Judith river. By F. V. Hayden, M. D. On Extinct Vertebrata from the Judith river and great lignite formations of Nebraska. By Joseph Leidy, M.D. 4to. Philadelphia, 1858. From Dr. Leidy.

October 18th. Proceedings of the Boston Society of Natural History. Vol. 7, pages 1 to 32, and 97 to 128. From the Society.

The Eclectic Medical Journal of Philadelphia. Vol. 2, No. 10. From the Editor.

The Canadian Journal of Industry, Science and Art. No. 23, Sept. 1859. From the Institute.

Wiener Entomologische Monatschrift. No. 10. Band 3, October, 1859. From the Editors.

Transactions of the American Philosophical Society. Vol. 12, New series, part 11.

Journal of the Franklin Institute. Vol. 38, No. 4, October, 1849. From Dr. T. B. Wilson on the usual conditions:

November 1st. The Dental Cosmos. Vol. 1, No. 4, Nov. 1859. From the Editors.

The Farmer and Gardener. Vol. 1, No. 2. October, 1858. From the Editors.

Recueil des Actes d L'Académie Impériale des Sciences, Belles-Lettres et Arts de Bordeaux. 1st part, 1859. From the Academy.

Transactions of the Academy of Science of St. Louis. Vol. 1, No. 3. From the Academy.

The following are from Dr. T. B. Wilson, on the usual conditions:

Novitates Conchologicæ. Par Dr. Louis Pfeiffer. 11th Livraison. 1857.

Palëontologie Lombarde, 6th, 7th and 8th. Livr.

Bryologia Javanica. 17th Fasciculus.

Ueber einige Farngattungen von Dr. G. Mettenius, 5 Cheilanthes, 6 Asplenium.

Palæontographica von Hermann von Meyer siebenter Band. Erste Lieferung.

Wiener Entomologische Monatschrift. 2 Band, No. 8, August, 1858.

Archiv für Anatomie Physiologie, &c. Von Dr. Johan Müller, No. 6, 1857.

Abel's Aus der Natur. Vol. 12.

Biographisch-Literarisches Handwörterbuch von J. C. Poggendorff. 3 Lief.

Monographia Heliceorum Viventium. Dr. L. Pfeiffer. Vol. 4th pars 2d.

Systematisches Conchylien-Cabinet. Von Martini und Chemnitz. 168 Lieferung.

Tresor de Livres rares et precieux ou Nouveau Dictionnaire Bibliographique, par J. G. T. Graesse. 6th Livr.

Monographia des Picides ou Histoire Naturelle Générale et particulierè, pàr Alfred Malherbe. 1st Livrais.

Revue de Zoologie pure et applique, par M. F. E. Guerin Méneville. No. 9, 1859. From the Editor.

Annales des Mines. Vol. 14, 5th series, 6th Livr. 1858. From the Minister of Public Works.

November 8th. Recueil des Actes de L'Académie Impériale des Sciences, Belles-Lettres et Arts de Bordeaux. 4me trimestre, 1858. From the Academy.

Bulletin de la Société Linéenne de Normandie. 3 vol. Année, 1857-58. From the Society.

Bulletin de la Société des Sciences Naturelles de Neuchatel. Tome 4, 2d and 3d cahier. From the Society.

Katalog. des Bücherlagers. Von F. O. Weigel Erstes supplement. Verzeichniess von manuscripten, Beiberdrucken ersten Erzeugnissen der Druckerpresse, &c., von F. O. Weigel in Leipzig; Verlags-Werke von F. O. Weigel, 1858: Katalog. Naturwissenschaftlicher Werke aus dem antiquarischen Lager, von F. O. Weigel; Catalogue Mensuel de Livres Anciens, Rares, et Curieux qui se trouvent chez. F. O. Weigel a Liepzig, Nos. 1–6. From F. O. Weigel.

Nachrichten von der George Augustus-Universitat under Königl. Gesellschaft der Wissenschaften zu Göttingen, 1858. No. 1–28. From the Royal Society of Sciences at Göttingen.

Vierundvierzigster Jahresbericht der Naturforschenden Gesellschaft in Emden, 1858. Von Dr H. Metzer. From the Society.

Allgemeine Theorie der Curven Doppelter Krümmung in rein geometrischer Darstellung. Von Dr. Wilhelm Schell. 8vo tract. From the Author.

Neues Jahrbuch für Mineralogie, Geognosie, Geologie, &c. Von R. C. von Leonhard und H. G. Bronn, Jahrgang, 1859. 2d and 3d heft. From the Editors.

Verhandlungen des Vereins zür Beförderung des Gartenbaues in den K. Preuss. Staaten. Sechster Jahrgang, 2d heft. Novem. und Decem. 1858, Berlin. From the Society.

Archiv. für Naturgeschichte. Von Dr. F. H. Troschel. 24th vol. 5th part. From the Editor.

Jahresbericht uber die Verwaltung des Medicinalwesens die Krankenanstalten und die Oeffentlichen Gesundheitsverhaeltnisse der frien Stadt Frankfurt. Von dem Aertzlichen Verein 1st Jahrgang, 1857. From the Society.

Die Klassen und Ordnungen des Thier-Reichs wissenschaftl. dargestellt in Wort und Bild. Von Dr. H. G. Bronn. Erster Band, 1–4 Lieferung. Leipzig, 1859. From the Author.

Jahrbuch der Kaiser-König. Geologischen Reichsanstalt. 9th Jahrgang, No. 4, Oct. Nov. Dec. From the Institute.

Uebersicht der Witterung im nördlichen Deutschland nach den Beobachtungen des meteorolgischen Instituts zu Berlin Jahrgang. 1855, 56, 57, 58.

Monatsbericht der Königlichen Preuss. Akad. der Wissenschaften zu Berlin, 1858. July, Aug., Sept., Oct., Nov. and Dec. From the Academy.

Verhandlungen des naturhistorischen Vereines der preussischen Rheinlande und Westphalens. 14th vol. 1857. 2d and 3d parts, 1858. 1st, 2d, 3d, and 4th parts. From the Society.

Sitzungs-Berichte für das Gesellschaftsjahr, 1858. From the Society. (Würzburg.)

Zeitschrift für die gesammten Naturwissenschaften, 1858, 12th vol. From the Nat. Hist. Society of Saxony and Thuringia in Halle.

Report of the Proceedings of the Geological and Polytechnic Society of the West-Riding of Yorkshire, 1858-9. Annual Report for 1858—59 of the Leeds Philosophical and Literary Society. From the Soc.

Proceedings of the Royal Society, vol. 10, Nos. 35 and 36. From the Royal Society.

Journal of the Society of Arts and of the Institutions in Union. Vol. 7th, Nos. 332 to 353. From the Society.

The Canadian Naturalist and Geologist. Vol. 4, No. 5, 1859. From the Natural History Society of Montreal.

The California Farmer, containing notes on the Condors of Chili and California. By Alex. S. Taylor. From the Author.

Hutching's California Magazine. No. 36. June, 1859. From the Editor.

The American Journal of Science and Arts. Vol. 28, No. 84. Nov. 1859. From the Editors.

May. 15th. On the microscopic structure of some Canadian Limestones. By J. W. Dawson. 8vo tract. 1859, Montreal. From the Author.

Notes upon some Rubiaceæ, upon some Polynesian Loganiaceæ and Diagnosis of the Sandal-woods of the Sandwich Islands. By Asa Gray, M. D. 8vo tract. Boston, 1858-59. From the Author.

American Journal of Pharmacy 3d series, vol. 7, No. 6. Nov. 1859. From the Editor.

North American Medico-Chirurgical Review. Vol. 3, No. 6. Nov. 1859. From the Editors.

American Journal of the Medical Sciences. No. 76, new series, October, 1859. From the Editor.

The New York Journal of Medicine, No. 99, November, 1859. From the Editor.

The New Orleans Medical and Surgical Journal. Vol. 16, No. 6. Nov. 1859. From the Editors.

The Atlantis, a Register of Literature and Science. No. 4, July, 1859. From the Editors.

Description of "Two New Dioecious Grasses of the United States." By George Engelman, M. D., St. Louis. Aug. 1859, and systematic arrangement of the species of the Genus Cuscuta, with critical remarks on old species and descriptions of new ones. By George Engelmann, M. D. St. Louis, 1859. From the Author.

The Terrestrial air-breathing mollusks of the United States and adjacent Territories of North America. By W. G. Binney. Vol. 4. Boston. From Mrs. Lucy W. Say.

Arctic Explorations in the years 1853, '54, '55. By Elisha Kent Kane, M. D., U. S. N. Vols. 2. Philada., 1856. From Dr. John K. Kane.

Nov. 22*d.* Report of the Commissioner of Patents for the years 1857 and 1858. Agriculture. 8vo. Washington. 2 vols. From the Smithsonian Institution.

Southern Medical and Surgical Journal. Vol. 15, No. 11, Nov. 1859. From the Editors.

Charleston Medical Journal and Review. Vol. 14, No. 6. Nov. 1859. From the Editor.

The following are from Dr. T. B. Wilson, on the usual conditions:

Journal of the Franklin Institute. 3d series, vol. 38, No. 5. Nov. 1859.

List of the specimens of Lepidopterous Insects in the collection of the British Museum. By Francis Walker. Part 18. Pyralides, 1859.

Comptes Rendus des Séances et Mémoires de la Société de Biologie, Tome quatrième de la deuxième serie. Annee, 1857. Paris.

Exotic Butterflies, being Illustrations of new species. By William C. Hewitson. Part 31 and 32.

Conchologia Iconica. By Lowell Reeve. Parts 186 and 187.

Planches Coloriées des Oiseaux de la Belgique. Livr. 122 and 123.

Expedition dans les parties centrales de L'Amerique due Sud,—sous la direction de Comte Francis de Castlenau. Sixieme Partie Botanique. Livr. 9—11.

Dec. 6*th.* Report of the Secretary of State on the Criminal Statistics of the State of New York. 8vo. Albany.

A Statistical view of American Agriculture. By John Jay, Esq. 8vo. New York, 1859.

The Geography and Resources of Arizona and Sonora. By Sylvester Mowry. 8vo. Washington, 1859.

On the Statistics and Geography of the Production of Iron. By Abram S. Hewitt. 8vo. New York, 1856.

Memoir of the Physical and Political Geography of New Grenada. By Gen. F. C. de Mosquera. Translated from the Spanish by Theodore Dwight. 8vo. New York, 1853.

Access to an open Polar Sea, in connection with the search after Sir John Franklin and his companions. By E. K. Kane, M. D. 8vo. New York, 1853.

Railroad to the Pacific, Northern Route. By Edwin F. Johnson, C. E. 8vo. New York, 1854.

Report on the extension of the Decimal system to the Weights and Measures of the United States. 8vo. New York, 1857.

Charter, By-laws, Formation of Sections and List of Members of the American Geographical and Statistical Society. 8vo. New York, 1857.

Annual Report of the Council and Officers of the American Geographical and Statistical Society, for the year ending Dec., 1857. 8vo. New York, 1858.

Bulletin of the American Geographical and Statistical Society. 2 vols. 8vo. New York, 1852 to 1857. Journal of the American Geographical and Statistical Society. Vol. 1, Nos. 1 to 9, inclusive. 4to. New York. Jan. to Nov., 1859. From the Society.

The Dental Cosmos. Vol. 1, No. 5. December, 1859. From the Editors.

Revue et Magasin de Zoologie pure et appliquée. No. 10. 1859. From the Editor.

The Canadian Journal of Industry, Science and Art. New series, No. 24. From the Institute.

Histoire Naturelle des Insectes, Genera des Coléoptéres. Par M. Th. Lacordaire. Tome cinquième et Atlas. 8vo. Paris, 1859. From the Author.

Illustrated Natural History of the Animal Kingdom, being a systematic and popular description of the habits, structure and classification of Animals, from the highest to the lowest forms. By S. G. Goodrich. 2 vols. imp. 8vo. New York, 1859. From the Author.

Rubi Germanici. By Weike and Nees von Esenbeck. Folio. 1822 to 1826. Fasciculi 3 to 10. From B. Westerman & Co.

The following are from Dr. T. B. Wilson, on the usual conditions:

Post-Pleiocene Fossils of South Carolina. By Francis Holmes, A. M. 4to. Nos. 6 and 7. Charleston, 1859.

Photographs of Edward and Jules P. Verreaux, of Paris. From E. and J. P. Verreaux, through Dr. S. W. Woodhouse.

Photograph of Dr. T. B. Wilson. From Dr. J. C. Fisher.

Photograph of Isaac Lea, LL. D. From the President of the Academy.

Dec. 13th. Geological Report of the country along the line of the Southwestern branch of the Pacific Railroad, State of Missouri. By G. C. Swallow. 8vo. St Louis, 1859. From the author.

Views on the Vine-growing resources of St. Louis and adjacent counties of Missouri. By Charles H. Haven. 8vo. tract. From the Academy of Sciences. St. Louis.

The Transactions of the Academy of Science of St. Louis. Vol. 1, Nos. 1—3. From the Academy.

The following is from Dr. T. B. Wilson, on the usual conditions:

The complete writings of Thomas Say on the Entomology of North America. Edited by John L. Le Conte, M. D., with a memoir of the Author, by George Ord. 2 vols. 8vo. New York, 1859.

Dec. 20th. Wiener Entomologische Monatschrift. Band 3, No. 11. Nov. 1859. From the Editors.

Dyas et Trias ou le Nouveau Grès Rouge en Europe dans L'Amerique du Nord et dans L'Inde. Par M. Jules Marcou. 8vo. tract. Geneve, 1859. From the Author.

Journal of the Society of Arts and of the Institutions in union. Vol. 7, Nos. 354 to 358, inclusive. For September, 1859. From the Society.

Edinburgh New Philosophical Journal. New series, Vol. 10, No. 2. Oct. 1859. From the Editors.

The following are from the Biological Department:

Cuvier. Histoire de ses Travaux. Par P. Flourens. 12mo. Paris, 1845.

Fontenelle ou de la Philosophie moderne relativement aux Sciences Physiques. Par P. Flourens. 12mo. Paris, 1847.

Histoire des Travaux et des Idées de Buffon. Par P. Flourens. 12mo. Paris, 1850.

Leçons sur les effects des substances toxiques et Médicamenteuses. Par M. Claude Bernard. 8vo. Paris, 1857.

Leçons de Physiologie expérimentale appliquée a La Médecine, faites au Collège de France. Par M. Claude Bernard. 2 vols. 8vo. Paris, 1855–56.

Leçons sur La Physiologie et La Pathologie du Système Nerveux. Par M. Claude Bernard. 2 Vols. 8vo. Paris, 1858.

Recherches Anatomiques et Physiologiques sur L'Organe de L'Ouie et sur L'Audition, dans L'Homme et les Animaux vertebres. Par G. Breschet. 4to.

On animal and vegetable Parasites of the human body, a Manual of their Natural History, Diagnosis and Treatment. By Dr. Fred. Küchenmeister, translated from the 2d German edition by Edwin Lankester, M. D. 2 vols. 8vo. London, 1857.

On Tape and Cystic Worms, with an Introduction on the origin of Intestinal Worms. By C. T. von Siebold, translated by T. H. Huxley, F. R. S. 8vo. London, 1857. Bound with the 2d vol. of Küchenmeister on Parasites.

Œuvres de Car. Legallois. Vols. 1 and 2 in one, 8vo. Paris, 1830.

Planches Anatomiques et Descriptives. Text, 8vo. Atlas, 4to. Paris, 1838, 1839.

Observations on the structure and functions of the Spinal Cord. By R. D. Grainger. London. 8vo. 1837.

On the structure and use of the Spleen. By Henry Gray, F. R. S. 8vo. London, 1854.

An Introduction to Medical Literature, including a system of practical Nosology. By Thomas Young, M. D. 8vo. London, 1823.

The works of William Hewson, F. R. S., with an introduction and notes. By George Gulliver, F. R. S. 8vo. London, 1846.

The works of Wm. Harvey, M. D., translated from the Latin, with a life of the Author. By Robt. Willis, M. D. 8vo. London, 1847.

Württembergische naturwissenschaftliche Jahreshefte, fünfzehnter, Jahrgang, 3 Heft. From the Society.

Verhandlungen des Vereines zur Beförderung des Gartenbaues in den Königlich Preussischen Staaten. 5 Jahrgang, 3 Heft, and 6 Jahrgang, 1 Heft. From the Society.

Jahrbuch der Kaiserlich Königlichen Geologischen Reichsanstalt. 10th Jahrgang, No. 1. From the Institute.

Ueber ein Psychophysisches Grundgesetz und dessen Beziehung zur Schätzung der Sterngrössen.

Elektrische Untersuchungen. Von W. G. Hankel.

Neue Beiträge zur Kentniss der Embryobildung der Phanerogamen. Von W. Hofmeister,

Berichte über die Verhandlungen der Königlich Sächsischen Gesellschaft der Wissenschaften su Leipzig. 2 and 3 Heft. 1858. From the Society.

Archiv für Naturgeschichte. Von Dr. F. H. Troschel. From Dr. Troschel. 1st and 2d Heft, 24th Jahrgang. 6th Heft and 25th Jahrgang.

Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefakten-Kunde. Von R. C. von Leonhard und H. G. Bronn. Jahrgang, 1859. 4th Heft. From the Editor.

Crania Selecta, Thesauris Anthropologicis Acad. Imperialis Petropolitanæ Iconibus et descriptionibus illustravit. C. E. de Baer. 4to. Petropoli, 1859.

Uber Papuas und Alfuren. Von K. E. von Baer. 4to. St. Petersburg, 1859. From the Author.

Proceedings of the Literary and Philosophical Society of Liverpool during the 48th session. 1858–59. No. 13. From the Society.

The following are from Dr. T. B. Wilson, on the usual conditions:

The Natural History of the Tineina. Vol. 4th, containing the Coleophora, part 1st. By H. T. Stainton, London, 1859.

Journal of the Franklin Institute. 3d series, Vol. 38, No. 6. December, 1859.

Planches Coloriées des Oiseaux de La Belgique et leurs Œufs. Par Ch. F. Dubois. Livrs. 124 and 125.

Thesaurus Conchyliorum, or figures and descriptions of recent Shells. By G. B. Sowerby. Part 19.

Post-pliocene Fossils of South Carolina. By F. S. Holmes, A. M. 4to, Nos. 8, 9 and 10. Charleston, 1859.

New York Journal of Medicine. 1st series, 10 vols. 2d series, 16 vols. 3d series, 7 vols. From the Biological Department.

Journal of the American Geographical and Statistical Society. Vol. 1, No. 10. Dec. 1859.

On the claims of the Materia Medica, an Introductory Lecture delivered in the University of Pennsylvania, Oct. 10th, 1859, by Joseph Carson, M. D. From the Author.

CATALOGUE

OF THE

INVERTEBRATE FOSSILS

OF THE

CRETACEOUS FORMATION OF THE UNITED STATES,

WITH REFERENCES.

BY

WM. M. GABB.

SEPTEMBER, 1859.

CATALOGUE.

CRUSTACEA.

Balanus Lam.

B. peregrinus Morton, 1834, Synopsis, p. 72, pl. 10, f. 5.

Callianassa Leach.

C. Danai Hall & Meek, 1855, Memoirs, Am. Acad. 2d series, vol. 5, p. 379, pl. 1, f. 1.

There are several crabs found in New Jersey, but they have never been described.

Cytherina Lam.

C. Tippana Con., 1858, Journ. Acad. Nat. Sci. 2d series, vol. 3, p. 335, pl. 35, f. 31.

ANNELIDES.

Hamulus, Morton.

H. onyx S. G. M., 1834, Synopsis, p. 73, pl. 16, f. 5.

H. squamosus n. s. This is a hamulus from Prairie Bluff, very closely allied to H. onyx, but differing, in having a strongly marked raphe, which nearly doubles the width of the shell. It is placed on both sides and in the plane of the curve, Museum of Acad. Nat. Sci.

Vermetes.

V. rotula S. G. M., 1834, Synopsis, p. 81, pl. 1, f. 14.

Serpula Linn.

S. barbata S. G. M., 1834, Synopsis, p. 73, pl. 15, f. 12.

S. tenuicarinatus Meek & Hayden, 1857, Proc. Acad. vol. 9, p. 134.

CEPHALAPODA.

Ammonites Lam.

A. acuto-carinatus Shumard, 1853, Marcy's Rep. p. 209, pl. 1, f. 3.

A. angustus Tuomey, 1855, Proc. Acad. Nat. Sci. vol. 7, p. 168.

A. Belknapii Marcou, 1858, Geol. N. A. p. 34, pl. 2, f. 1.

A. binodosus Tuomey, 1855, Proc. Acad. vol. 7, p. 168.

A. carinatus Tuomey, 1855, Proc. Acad. vol. 7, p. 168.

A. complexus Hall & Meek, Mem. Am. Acad. vol. 5, p. 394, pl. 4, f. 1.

A. Delawarensis S. G. M., 1834, Synopsis, p. 37, pl. 2, f. 5.

A. Vanuxemi, S. G. M., 1834, Synopsis, p. 38, pl. 2, f. 34.

A. dentato-carinatus Rœmer, 1852, Kreide von Texas, p. 33, pl. 1, f. 2.

A. flaccidicosta Rœmer, 1852, Kreide von Texas, p. 33, pl. 1, f. 1.

A. geniculatus Con., 1857, Emory's Rep. vol. 1, part 2, p. 159, pl. 15, f. 2.

A. Gibbonianus Lea, 1840, Trans. Am. Phil. Soc. and Marcou, Geol. o North America, p. 35, pl. 2, f. 2.
A. Guadalupæ Rœmer, 1852, Kreide von Texas, p. 32, pl. 2, f. 1.
A. Halli Meek & Hayden, 1856, Proc. Acad. vol. 8, p. 70.
A. lobata Tuomey 1855, Proc. Acad. vol. 7, p. 168.
A. lenticularis, Owen, 1852, Report, p. 579, pl. 8, f. 5.
A. Leonensis Con., 1857, Emory's Rep. vol. 1, part 2, p. 160, pl. 16, f. 2.
A. magnificus Tuomey, 1855, Proc. Acad. vol. 7, p. 168.
A. Marciana Shumard, 1853, Marcy's Rep. p. 209, pl. 4, f. 5.
A. Novi-Mexicana Marcou, 1858, Geol. N. A. p. 35, pl. 1, f. 2.
A. Opalus Owen, 1852, Report, p. 579, pl. 8, f. 6.
A. Pedernalis Von Buch. Rœmer, Kreide von Texas, p. 34, pl. 1, f. 3.
A. percarinatus H. & M., 1855, Mem. Am. Acad. vol. 5, p. 394, pl. 4, f. 2.
A. Peruvianus Von Buch. Marcou, Geol. N. A. p. 34, pl. 5, f. 1.
A. placenta De Kay, 1828, Ann. Lyceum, vol. 2, pl. 5, f. 2.
A. pleurisepta Con., 1857, Emory's Rep. vol. 1, part 2, p. 159, pl. 15, f. 1.
A. ramosissimus Tuomey, 1855, Proc. Acad. vol. 7, p. 168.
A. Shumardi Marcou, 1858, Geol. N. A. p. 33, pl. 1, f. 1.
A. syrtalis S. G. M., 1834, Synopsis, p. 40, pl. 14, f. 4.
A. telifer S. G. M.. 1834, Synopsis, p. 38, pl. 2, f. 7.
A. Texanus Rœmer, 1852, Kreide von Texas, p. 31, pl. 3, f. 1.
A. vespertinus S. G. M., 1834, Synopsis, p. 40, pl. 17, f. 1.

ANCYLOCERAS D'Orb.

A. approximans Con., 1855, Proc. Acad. vol. 7, p. 266.
A.? Mortoni Hall & Meek, 1855, Mem. Am. Acad. vol. 5, pp. 396, 411, pl. 4, f. 3.
A.? Nicolleti H. & M., 1855, Mem. Am. Acad. vol. 5, p. 397, pl. 4, f. 4.

BACULITES Lam.

B. annulatus Con., 1855, Proc. Acad. vol. 7, p. 265.
B. asper S. G. M., 1834, Synopsis, p. 43, pl. 1, f. 12, 13, and pl. 13, f. 2.
B. carinatus S. G. M., 1834, Synopsis, p, 44, pl. 13, f. 1.
Compare *B. anceps*, Lam., Anim. Sans. Verteb., tome vii. p. 648.
B. columna S. G. M., 1834, Synopsis, p. 44, pl. 19, f. 8.
B. compressus Say, 1821, Am. Jour. Sci. vol. 2, p. 41, and Hall & Meek, Mem. Am. Acad. 2d series, vol. 5, p. 400, pl. 5, f. 2.
B. grandis H. & M., 1855, Mem. Am. Acad. vol. 5, p.402, pl. 6, 7 and 8.
B. labyrinthicus S. G. M., 1834, Synopsis, p. 44, pl. 13, f. 10.
B. ovatus Say, 1829, Jour. Acad. 1st series, vol. 6, pl. 5, f. 5, 6, and Hall & Meek, Mem. Am. Acad. 1st series, vol. 5, p. 399, pl. 5, f. 1, and pl. 6, f. 1–7.
B. Spillmani Con., 1858, Jour. Acad. 2d series, vol. 3, p. 335, pl. 35, f. 24.
B. Tippaensis Con., 1858, Jour. Acad. 2d series, vol. 3, p. 334, pl. 35, f. 27.

BELEMNITES Agricola.

B.? ambiguus S. G. M., 1834, Synopsis, p. 35, pl. 1, f. 4, 5.

BELEMNITELLA D'Orb.

B. Americana.
Belemnites Americanus, S. G. M., 1834, Synopsis, p. 34, pl 1, f. 1–3.
Compare *B. mucronata*, Schlotheim.
B. bulbosa Meek & Hayden, 1856, Proc. Acad. vol. 8, p. 70.

CRIOCERAS Morris.

C. Conradi Con., 1855, Proc. A. vol. 7, p. 266.
Ammonceratites Conradi, S. G. M., 1841, Proc. Acad. vol. 1, p. 109.

HAMITES Parkinson.

H. Arculus S. G. M., 1834, Synopsis, p. 44, pl. 15, f. 1, 2.
H. Fremonti Marcou, 1858, Geol. N. A. p. 36, pl. 1, f. 3.
H. larvatus Con., 1855, Proc. Acad. vol. 7, p. 265.
H. rotundatus Con., 1855, Proc. Acad. vol. 7, p. 266.
H. torquatus S. G. M., 1834, Synopsis, p. 45, pl. 15, f. 4.
H. trabeatus S. G. M., 1834, Synopsis, p. 45, pl. 15, f. 3.

NAUTILUS Breynius.

N. De Kayii S. G. M., 1834, Synopsis, p. 33, pl. 8, f. 4.
N. perlatus S. G. M., 1834, Synopsis, p. 33, pl. 13, f. 4.
N. elegans Sow., Rœmer, 1852, Kreide von Texas, p. 37.
N. simplex Sow., Rœmer, 1852, Kreide von Texas, p. 37.
N. Spillmani Tuomey, 1855, Proc. Acad. vol. 7, p. 167.
N. angulus Tuomey, 1855, Proc. Acad. vol. 7, p. 167.

NAUTILITES Martin, Brown.

N. Alabamensis Con., 1858, Jour. Acad. 2d series, vol. 3, p. 335.
Nautilus Alabamensis S. G. M., 1834, Synopsis, p. 33, pl. 18, f. 3.
N. orbiculatus Con., 1858, Jour. Acad. 2d series, vol. 3, p. 335.
Nautilus orbiculatus Tuomey, 1855, Proc. Acad. vol. 7, p. 167.

PTYCHOCERAS D'Orb.

P. annulifer.
Hamites annulifer S. G. M., 1842, Jour. Acad. 2d series, vol. 8, pl. 11, f. 4.
P. Mortoni Meek & Hayden, 1857, Proc. Acad. vol. 9, p. 134.

SCAPHITES Parkinson.

S. Conradi.
Ammonites Conradi S. G. M., 1834, Synopsis, p. 39, pl. 16, f. 1–3, and pl. 19, f. 4.
A. borealis S. G. M., 1841, Proc. Acad. vol. 1, p. 107.
A. Mandanensis S. G. M., 1842, Jour. Acad. 1st series, vol. 8, p. 208, pl. 10, f. 2.
A. Nicolletti S. G. M., 1842, Jour. Acad. 1st series, vol. 8, p. 209, pl. 10, f. 3.
A. Abyssinis S. G. M., 1842, Jour. Acad. 1st series, vol. 8, p. 209, pl 10, f. 4.
A. Nebrascensis Owen, 1852, Report, p. 577, pl. 8, f. 3, and pl. 8a, f. 2.
A. Moreauensis Owen, 1852, Report, p. 579, pl. 8, f. 7.
A. Cheyennensis Owen, 1852, Report, p. 578, pl. 7, f. 2.
Scaphites comprimus Owen, 1852, Report, p. 580, pl. 7, f. 4.
S. hippocripis.
Ammonites hippocripis De Kay, 1828, Ann. Lyceum, vol. 2, pl. 5, f. 5.
S. Cuvieri S. G. M., 1834, Synopsis, p. 41, pl. 7, f. 1.
S. iris Con., 1858, Jour. Acad. 2d series, vol. 3, p. 335, pl. 35, f. 23.
S. nodosus Owen, 1852, Report, p. 581, pl. 8, f. 4.
S. reniformis S. G. M., 1834, Synopsis, p. 42, pl. 2, f. 6.
Compare *S. striatus* Mantell.
S. semicostatus Rœmer, 1852, Kreide von Texas, p. 35, pl. 1, f. 5.
S. Texanus Rœmer, 1852, Kreide von Texas, p. 35, pl. 1, f. 6.

TURRILITES Lam.

T. alternatus Tuomey, 1855, Proc. Acad. vol. 7, p. 168.
T. Brazœnsis Rœmer, 1852, Kreide von Texas, p. 37, pl. 3, f. 2.
T. Cheyennensis M. & H., 1856, Proc. Acad. vol. 8, p. 280.
Ancyloceras? Cheyennensis M. & H., 1856, Proc. Acad. vol. 8, p. 71.
T. Nebrascensis M. & H., 1856, Proc. Acad. vol. 8, p. 280.
Ancyloceras? Nebrascensis M. & H., 1856, Proc. Acad. vol. 8, p. 71.

GASTEROPODA.

Acteon Montfort.

A. subellipticus Meek & Hayden, 1856, Proc. Acad. vol. 8, p. 63.
A. concinnus Hall & Meek, 1855, Mem. Am. Acad. vol. 5, p. 390, pl. 1, f. 4.

Acteonella D'Orb.

A. dolium Rœmer, 1852, Kreide von Texas, p. 43, pl. 4, f. 4.

Aporrhais Petiver.

A. decemlirata Con., 1858, Jour. Acad. 2d series, vol. 3, p. 330, pl. 34, f. 11.

Avalana.

A. subglobosa Meek & Hayden, 1856, Proc. Acad. vol. 8, p 64.

Buccinum Lam.

B. constrictum (*Fusus constrictus*) Hall & Meek, 1855, Mem. Am. Acad. 2d series, vol. 5, p. 391 and 411, pl. 3, f. 7.
B.? vinculum Hall & Meek, 1855, Mem. Am. Acad. vol. 5, p. 390, pl. 3, f. 5.

Buccinopsis.

B. Parryi Con., 1857, Emory's Report, vol. 1, part 2, p. 158, pl. 3, f. 4.

Bulla Klein.

B. minor Meek & Hayden, 1856, Proc. Acad. vol. 8, p. 69.
B. Mortoni Forbes, 1845, Jour. Geol. Soc. London, vol. 1, p. 63.
B. occidentalis Meek & Hayden, 1856, Proc. Acad. vol. 8, p. 69.
B. volvaria Meek & Hayden, 1856, Proc. Acad. vol. 8, 69.
B. subcylindrica Meek & Hayden, 1856, Proc. Acad. vol. 8, p. 270.

Bullopsis Con.

B. cretacea Con., 1858, Jour. Acad. 2d series, vol. 3, p. 334.

Busycon Bolten.

B. Bairdi M. & H., 1856, Proc. Acad. vol. 8, p. 126.
Pyrula Bairdi M. & H., 1856, Proc. Acad. vol. 8, p. 66.

Capulus Montfort.

C. fragilis M. & H., 1856, Proc. Acad. vol. 8, p. 68.
C. occidentalis H. & M., 1855, Mem. Am. Acad. vol. 5, p. 381, pl. 1, f. 13.
Orbicula (*undet.*) Owen, Report, pl. 7, f. 11.

Cerithium Adamson.

C. nodosus Tuomey, 1855, Proc. Acad. vol. 7, p. 170.

Chemnitzia D'Orb.

C.? distans Con., 1858, Jour. Acad. 2d series, vol. 3, p. 333, pl. 35, f. 3[illegible]
C. gloriosa Rœmer, 1852, Kreide von Texas, p. 40, pl. 4, f. 3.
C.? interrupta Con., 1858, Jour. Acad. 2d series, vol. 3, p. 333, pl. 3[illegible] f. 15.

Cirrus Sow.

C. crotaloides S. G. M., 1834, Synopsis, p. 49, pl. 19, f. 5.

Conus Linn.

C. canalis Con., 1858, Jour. Acad. 2d series, vol. 3, p. 331, pl. 3[illegible]
C. gyratus S. G. M., 1834, Synopsis, p. 49, pl. 10, f. 13.

DELPHINULA Lam.

D. lapidosa S. G. M., 1834, Synopsis, p. 46, pl. 19, f. 7.

DENTALIUM Linn.

D. fragilis M. & H., 1856, Proc. Acad. vol. 8, p. 69.
D. gracilis H. & M., 1855, Mem. Am. Acad. vol. 5, p. 383, pl. 3, f. 11.
D. subarcuatum Con., 1853, Jour. Acad. 2d series, vol. 2, p. 276, pl. 24, f. 13.

DRILLIA Gray.

D. novemcostata Con., 1858, Jour. Acad. 2d series, vol. 3, p. 331, pl. 35, f. 13.
D.? Tippana Con., 1858, Jour. Acad. 2d series, vol. 3, p. 331, pl. 35, f. 5.

FASCIOLARIA Lamarck.

F. buccinoides M. & H., 1856, Proc. Acad. vol. 8, p. 67.
F. cretacea M. & H., 1856, Proc. Acad. vol. 8, p. 66.

FICUS Klein.

F. octoliratus Con., 1858, Jour. Acad. 2d series, vol. 3, p. 332, pl. 35, f. 6.

FUSUS Klein.

F. contortus M. & A., 1856, Proc. Acad. vol. 8, p. 65.
F. Culbertsonii M. & H., 1856, Proc. Acad. vol. 8, p. 65.
F. Dakotensis M. & H., 1856, Proc. Acad. vol. 8, p. 65.
F. Enfauliensis Tuomey, 1855, Proc. Acad. vol. 7, p. 169.
F. flexuicostatus M. & H., 1856, Proc. Acad. vol. 8, p. 66.
F. Galpinianus M. & H., 1856, Proc. Acad. vol. 8, p. 65.
F. intertextus M. & H., 1857, Proc. Acad. vol. 8, p. 65.
F. Newberryi M. & H., 1856, Proc. Acad. vol. 8, p. 66.
F. Pedernalis Rœmer, 1852, Kreide von Texas, p. 38, pl. 4, f. 13.
F. Scarboroughi M. & H., 1857, Proc. Acad. vol. 9, p. 139.
F. Shumardii H. & M., 1855, Mem. Am. Acad. vol. 5, p. 391, pl. 3, f. 6.
F. subturritus M. & H., 1857, Proc. Acad. vol. 9, p. 139.
F.? tenuilineata H. & M., 1855, Mem. Am. Acad. vol. 5, p. 392, pl. 3, f. 8.
F. turriculus Tuomey, 1855, Proc. Acad. vol. 7, p. 169.
F. Vaughani M. & H., 1857, Proc. Acad. vol. 9, p. 138.

GLOBICONCHA D'Orb.

G. coniformis Rœmer, 1852, Kreide von Texas, p. 42, pl. 4, f. 5.
G.? elevata Shumard, 1853, Marcy's Report, p. 208, pl. 4, f. 3.
G. planata Rœmer, 1852, Kreide von Texas, p. 41, pl. 4, f. 6.
G. tumida Shumard, 1853, Marcy's Report, p. 208, pl. 5, f. 3.

HARPAGO Klein. (*Pterocera* Lam.)

H. Tippanus Con., 1858, Jour. Acad. 2d series, vol. 3, p. 331, pl. 35, f. 25.

HELCION Montfort.

H. alveolus M. & H., 1856, Proc. Acad. vol. 8, p. 68.
H. carinatus M. & H., 1856, Proc. Acad. vol. 8, p. 68.
H. patelliformis M. & H., 1856, Poc. Acad. vol. 8, p. 68.
H. subovatus M. & H., 1856, Proc. Acad. vol. 8, p. 68.
H. Borealis.
Hipponyx Borealis S. G. M., 1842, Jour. Acad. vol. 8, p. 210.

EULIMA Risso.

E. subfusiformis Shumard, 1853, Marcy's Report, p. 208, pl. 4, f. 3.
E. Texana Rœmer, 1852, Kreide von Texas, p. 40, pl. 4, f. 2.

NATICA Risso.

N. Abyssina S. G. M., 1834, Synopsis, p. 49, pl. 13, f. 13.
N. ambigua M. & H., 1856, Proc. Acad. vol. 8, p. 64.
N. collina Con., 1857, Emory's Report, vol. 1, part 2d, p. 157, pl. 13, f. 2 This may be the young of Texana, according to Conrad.
N. concinna H. & M., 1855, Mem. Am. Acad. vol. 5, p. 389, pl. 3, f. 2.
N. Moreauensis M. & H., 1856, Proc. Acad. vol. 8, p. 64.
N. occidentalis M. & H., 1856, Proc. Acad. vol. 8, p. 64.
N. obliquata H. & M., 1855, Mem. Am. Acad. vol. 5, p. 389, pl. 3, f. 1.
N. paludinæformis H. & M., 1855, Mem. Am. Acad. vol. 5, p. 389, pl. 3, f. 3.
N. Pedernalis Rœmer, 1852, Kreide von Texas, p. 43, pl. 4, f. 1.
N. (*Lunatia*) petrosa S. G. M., 1834, Synopsis, p. 48, pl. 19, f. 5.
N. prægrandis Rœmer, 1852, Kreide von Texas, p. 44.
N. Texana Con., 1857, Emory's Report, vol. 1, part 2d, p. 157, pl. 13, f. 1.
N. (*Lunatia*) rectilabrum Con., 1858, Jour. Acad. 2d series, vol. 3, p. 344, pl. 35, f. 28.
N. subcrassa M. & H., 1856, Proc. Acad. vol. 8, p. 87.
N. Tuomeyana M. & H., 1856, Proc. Acad. vol. 8, p. 270.

NERINEA Defrance.

N. acus Rœmer, 1852, Kreide von Texas, p. 42, pl. 4, f. 10.
N. Schotti Con., 1857, Emory's Report, vol. 1, part 2d, p. 158, pl. 14, f. 3.
N. Texana Rœmer, 1852, Kreide von Texas, p. 41, pl. 4, f. 7.

NODOSARIA Lam.

N. Texana Con., 1857, Emory's Report, vol. 1, part 2, p. 159, pl. 14, f. 4.

PATELLA List.

P. tentorium S. G. M., 1834, Synopsis, p. 50, pl. 1, f. 11.

PHORUS Montfort.

P. leprosus.
Trochus leprosus S. G. M., 1834, Synopsis, p. 46, pl. 15, f. 6.
P. umbilicatus Tuomey, 1855, Proc. Acad. vol. 7, p. 169.

PSEUDOBUCCINUM Meek & Hayden.

P. Nebrascensis M. & H., 1857, Proc. Acad. vol. 9, p. 140.
Buccinum Nebrascensis M. & H., 1856, Proc. Acad. vol. 8, p. 67.

PYRIFUSUS Con.

P. subdensatus Con., 1858, Jour. Acad. 2d series, vol. 3, p. 332, pl. 35, f. 12.

PYRULA Lam.

P. Richardsonii Tuomey, 1855, Proc. Acad. vol. 7, p. 169.
P. trochiformis Tuomey, 1855, Proc. Acad. vol. 7, p. 169.

RAPA Klein.

R. supraplicata Con., 1858, Jour. Acad. 2d series, val. 3, p. 332, pl. 35, f. 20.

RIMELLA Ag.

R. curviliratus Con., 1858, Jour. Acad. 2d series, vol. 3, p. 331, pl. 35, f. 9.

ROSTELLARIA Lam.

R. arenarum S. G. M., 1834, Syn. p. 48, pl. 5, f. 8.
R. biangulata M. & H., 1856, Proc. Acad. vol. 8, p. 65.
R. collina Con., 1857, Emory's Rep. vol. 1, part 2, p. 158, pl. 13, f. 3, 4.

R. fusiformis H. & M., 1855, Mem. Am. Acad. vol. 5, p. 393, pl. 10, f. 3.
R. Nebrascensis Evans & Shumard, 1855, Proc. Acad. vol. 7, p. 164.
R. pennata S. G. M., 1834, Syn. p. 48, pl. 19, f. 6.

ROSTELLITES Con.

R. Texana Con., 1855, Proc. Acad. vol. 7, p. 268.
R. ———. Casts of a species resembling the above, and probably identical, are found in the lower cretaceous beds of New Jersey. A comparatively perfect specimen was figured by Forbes in the London Jour. Geol. Soc., vol. 1, p. 63, f. *a*, under the name of voluta.

SCALARIA Lam.

S. annulata S. G. M., 1834, Syn., p. 47, pl. 3, f. 10.
S. cerithiformis M. & H., 1856, Proc. Acad. vol. 8, p. 63.
S. Sillimani S. G. M., 1834, Syn. p. 47, pl. 13, f. 9.
S. Texana Roemer, 1852, Kreide von Texas, p. 39, pl. 4, f. 11.

SOLARIUM Lam.

S. flexuistriatum Evans & Shumard, 1855, Proc. Acad. vol. 7, p. 173.

SOLIDULUS Fischer.

S. linteus Con., 1858, Jour. Acad. 2d series, vol. 3, p. 334, pl. 35, f. 11.

STROMBUS Linn.

S. densatus Con., 1858, Jour. Acad. 2d series, vol. 3, p. 330, pl. 34, f. 6.

TORNATELLA Lam.

T. bullata S. G. M., 1834, Syn. p. 48, pl. 5, f. 3.

TRICHOTROPIS Sow.

T. cancellaria Con., 1858, Jour. Acad. 2d series, vol. 3, p. 333, pl. 35, f. 8.

TURBO Linn.

T. Nebrascensis M. & H., 1856, Proc. Acad. vol. 8, p. 64.
T. tenuilineatus M. & H., 1856, Proc. Acad. vol. 8, p. 64.

TURRIS Rumphius (*Pleurotoma* Lam).

T. Ripleyana Con., 1858, Jour .Acad. 2d series, vol. 3, p. 332, pl. 35, f. 21, 29.

TURRITELLA Lam.

T. altilis Con., 1858, Jour. Acad. 2d series, vol. 3, p. 333.
T. convexa M. & H., 1856, Proc. Acad. vol. 8, p. 70.
T. encrinoides S. G. M., 1834, Syn., p. 47, pl 3, f. 7.
T. fastigiata Tuomey, 1855, Proc. Acad. vol. 7, p. 169.
T. irrorata Con., 1855, Proc. Acad. vol. 7, p. 268.
T. Moreauensis M. & H., 1856, Proc. Acad. vol 8, p. 70.
T. planilateris Con., 1857, Emory's Rep. vol. 1, part 2, p. 158, pl. 14, f. 1.
T. seriatim-granulata Rœmer, 1852, Kreide von Texas, p. 39, pl. 4, f. 12.
T. Tippana Con., 1858, Jour. Acad. vol. 3, 2d series, p. 333, pl. 35, f. 19.
T. vertebroides S. G. M., 1834, Syn. p. 47, pl. 3, f. 13.

VOLUTA Linn.

V. cancellata Tuomey 1855, Proc. Acad. vol. 7, p. 169.
V. fusiformis Tuomey, 1855. Proc. Acad. vol. 7, p. 169.
V. jugosa Tuomey, 1855, Proc. Acad. vol. 7, p. 169.
V. Spillmanii Tuomey, 1855, Proc. Acad. vol. 7, p. 169.

VOLUTILITHES Sow.

V. cretacea Con., 1858, Jour. Acad. 2d ser., vol. 3, p. 333, pl. 35, f. 16.

ACEPHALA.

Anomia O. F. Müll.

A. argentaria S. G. M., 1834, Syn. p. 61, pl. 5. f. 10.
A. sellaeformis Con., 1858, Jour. Acad. 2d ser., vol. 3, p. 330, pl. 34, f. 6.
A. tellinoides S. G. M., 1834, Syn. p. 61, pl. 5, f. 11.

Arca Linn.

A. subelongata Con., 1857, Emory's Rep. vol. 1, part 2, p. 148, pl. 6, f. 3.
A. uniopsis Con., 1853, Jour. Acad. 2d series, vol. 2, p. 275, pl. 24, f. 17.

Arcopagia Leach.

A. Texana Rœmer, 1852, Kreide von Texas, p. 46, pl. 6, f. 8.

Astarte Sow.

A. lineolata Rœmer, 1852, Kreide von Texas, p. 51, pl. 7, f. 8.
A. parilis Con, 1853, Jour. Acad., 2d series, vol. 2, p. 276, pl. 24, f. 16.
A. Texana Con., 1857, Emory's Rep. vol. 1, part 2, p. 152, pl. 5, f. 9.
A. Washitensis Shumard, 1853, Marcy's Rep. p. 206, pl. 3, f. 3.
A. gregaria M. & H., 1856, Proc. Acad. vol. 8, p. 84.

Avicula Klein.

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P. urticosa S. G. M., 1834, Synopsis, p. 62, pl. 10, f. 2.

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